102-07084/

water for life

seeking fresh ideas

work book

[illegible] the future of alberta's water

Alberta
GOVERNMENT OF ALBERTA

Please return work book in the envelope provided by **April 15, 2002**.
Work book is also available on-line at *www.waterforlife.gov.ab.ca*.

an introduction to alberta's water strategy

More than ever before, Alberta's water resources are facing significant challenges. Population growth, climate change, agricultural and industrial development have all contributed to water quantity and quality issues. Recent events in Walkerton, Ontario and North Battleford, Saskatchewan have turned the country's attention to the safety of drinking water across the country.

Alberta has adapted its water management policies over time to keep pace with new issues, but we need to do more. That is why Alberta is now developing a comprehensive water strategy. *Water for Life: Alberta's Strategy for Sustainability* will include short-, medium- and long-term means to ensure healthy ecosystems; safe, secure drinking water; and reliable, quality water supplies for a sustainable economy. It will build on the notion that knowledge is the foundation for making good water management decisions.

The Government of Alberta is seeking your input into the development of its water strategy. There is more than one opportunity for you to participate. Completing and submitting this work book represents one opportunity, attending a community workshop is another, and should you be randomly selected you may choose to participate in a telephone survey on this topic. For details on how you can participate, call 310-4455 or visit *www.waterforlife.gov.ab.ca*.

The input you provide the Government of Alberta will go a long way. Since the water strategy is a plan for the next 25 to 50 years, it is very possible that the ideas you submit today will come in handy in 2010, 2020 or maybe even 2052.

This work book, *Water fpr Life: Seeking Fresh Ideas*, is part of an information package available to all Albertans. The package also includes an information book and a brochure. The information book provides an overview of Alberta's current water resources, and outlines current water management policies and practices. The brochure details the water strategy's development and consultation processes, provides a complete listing of community workshop dates and locations, and offers some insight into the challenges facing Alberta's water.

Because water is a complex topic, you may choose to attend a community workshop for assistance in completing this work book. For those who are unable to attend a workshop, we have divided questions into two parts. Part A deals with the broad challenges and objectives the water strategy must address, while Part B focuses on more detailed options for water management in Alberta. You may need to reference the information book for assistance in completing Part B. This work book is also available on-line at www.waterforlife.gov.ab.ca.

the current situation

In the past we have seen relatively few water management conflicts: there has been enough water to meet the demands for industrial, agricultural and population growth; economic and land use activities did not create major impacts on the amount of water or its quality; technological improvements and regulatory systems have been able to limit the impact of agricultural, industrial and municipal discharges.

But times have changed. In the last several decades we have seen significant growth in a variety of industrial and agricultural sectors, the population has grown, and recent events in Walkerton and North Battleford have raised questions on the safety of drinking water across the country.

part ⓐ

what are the challenges?

Since the water strategy will address the future of Alberta's water management, some assumptions must be made about the challenges we will face in the future. Late last year, a small, diverse "ideas" group of Albertans provided the Government of Alberta their advice on water management in the province. Their input, combined with some additional research, has led to the list of challenges in the table below.

1. Review the following list of challenges. For each challenge, indicate whether you agree or disagree with the statement.

Possible Future Challenges	**Agree**	**Disagree**	**Unsure**
a. Water will become an increasingly scarce resource in Alberta	☐	☐	☐
b. Access to safe drinking water will become a significant issue for Albertans	☐	☐	☐
c. Water availability will limit growth in Alberta	☐	☐	☐
d. Climate change will seriously affect water flows in Alberta	☐	☐	☐
e. Industrial and agricultural growth will create greater demands for water – not always in places where water is plentiful	☐	☐	☐
f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth	☐	☐	☐
g. Surface water and groundwater will be vulnerable to pollution and contamination	☐	☐	☐
h. Flooding will pose a threat to human safety and create potential damage and economic costs	☐	☐	☐
i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important	☐	☐	☐
j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure	☐	☐	☐

2. Of these challenges, please indicate the three most important for the Government of Alberta to address: ☐ **a.** ☐ **b.** ☐ **c.** ☐ **d.** ☐ **e.** ☐ **f.** ☐ **g.** ☐ **h.** ☐ **i** ☐ **j**

3. Are there any additional challenges that should be considered?

____

____

____

what objectives should guide a future water strategy?

The "ideas" group identified four fundamental objectives for the water strategy. They are to ensure Alberta has:

- Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater)
- A safe, secure drinking water supply
- Reliable, quality water supplies for a sustainable economy
- The knowledge necessary to make effective water management decisions

Alberta's water strategy will assist the Government of Alberta to make wise water management decisions, now and in the future.

4. Do you agree these objectives should guide Alberta's water strategy? ☐ Yes ☐ Not Sure ☐ No

If no, what would you change or add?

____

____

part ⓑ

achieving safe secure drinking water

Private Water Systems

Private water systems are typically found in rural areas. Because of the distance between households, it is generally too expensive for these property owners to connect to a municipal drinking water system. Therefore, approximately 600,000 Albertans get their drinking water from a source other than an approved water treatment facility. They get their water by drilling into the ground, using a lake or river, or by hauling water in by truck and storing it in large holding tanks. Sometimes a group of rural residents will establish a water co-operative that provides untreated water to its members.

5. Do you get your water from your own private system? ☐ Yes ☐ No

6. Because private systems fall outside Alberta Environment's approval process, the safety of private water supplies can not be guaranteed. Currently, the property owner is responsible for ensuring his or her own water qualify and quantity.

Considering this, please review the options in the table below. For each option, indicate:

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Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Private Water Systems	**Implications to Consider**	**Whose Responsibility?**
Monitor the quality and safety of the water supply for private water systems	A single water sample costs between $50 and $150 to analyze, depending on the type of analysis	1 2 3
Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences	A recent project is estimated to cost $32 million to supply 500 rural families with water. Developing regional water supply systems is not feasible everywhere	1 2 3
Develop individual water supplies (e.g. well drilling, dugout construction, water hauling)	A well costs $5,000 to $15,000. A dugout costs $3,000 to $5,000. Hauling water costs $600 to $2,000 annually	1 2 3
Pump water from distant sources to dugouts during times of drought	Pumping costs vary greatly depending on the distance from the new water source. Assumes that another source is available within a reasonable distance	1 2 3
Add your own example		1 2 3
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Small Municipal Systems

Towns, villages, hamlets and municipal developments often find it difficult to pay for the construction and operation of water facilities. They also find it difficult to train and keep staff to operate these facilities.

7. Do you get your water from a small municipal system? ☐ Yes ☐ No

8. Alberta Environment currently sets and enforces drinking water standards for every Alberta municipality, reviews the water quality reports prepared by each municipality, and certifies the facility operators. Small municipal systems, however, are still more vulnerable to possible contamination as they are less able to invest in new technologies and overall improvements to their water treatment facilities.

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   Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Small Municipal Systems	Implications to Consider	Whose Responsibility?
Supply technical advice to small municipalities about facility operations, maintenance and monitoring	These services could be purchased from private firms or provided as a service of the provincial government	1 2 3
Monitor the quality and safety of water at small water treatment plants	This monitoring could be done by the municipality, consultants or provided as a service of the provincial government	1 2 3
Develop regional water supply systems	Provides consistent, high-quality drinking water (e.g. water from the City of Edmonton is currently provided to approximately 40 other communities as far away as Vegreville)	1 2 3
Add your own example...		1 2 3
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9. Do you think companies (public or private) should be allowed to invest in water systems and provide drinking water to small municipalities? ☐ Yes ☐ No

reliable, quality water supplies for a sustainable economy

The availability of water is a real constraint to the type, amount and location of economic growth in the province. Without sufficient water, Alberta may see significant constraints in the expansion of agriculture in the south, oil sands in the north, and petrochemical development in central Alberta. The water strategy must address the issue of water availability for continued economic growth in Alberta.

This section focuses on Alberta's economy, and striking the right balance between a sustainable economy, a healthy environment and the social well-being of Albertans.

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Agricultural, industrial and municipal water users apply to Alberta Environment for a license to use a set allocation of water. Wherever possible, water is managed to provide for these users. In times of shortage, however, the most recently issued license holders are asked to shut down so that more senior license holders can be assured their allocation under the current priority system. This system is known as *first in time, first in right*. The older the license the higher its priority, regardless of how the water is being used.

Before water can be allocated to new users, Alberta Environment must consider three things:

a) *Aquatic environment*
   The amount of water necessary to safeguard and maintain aquatic ecosystems must be determined and preserved.
b) *Apportionment agreements*
   Alberta has made commitments to the province of Saskatchewan and the state of Montana over the amount of water that will flow into each respective jurisdiction.
c) *Existing water licenses*
   New water allocations must not impact existing licenses.

The first step in deciding how much water can be allocated is to determine the amount necessary for the aquatic environment, for apportionment agreements, and for existing water license holders. This amount is subtracted from the total amount available, the remainder can then be used for supporting the economy and for human use. Depending on weather conditions, that amount is different each year.

Under current practices, once the total amount of water available for human use and economic development has been allocated, a moratorium is placed on the river basin or groundwater aquifer and no further water is allocated. Certain basins in southern Alberta are nearing the limits of water allocation – particularly during dry periods when less water is flowing in the rivers.

In the South Saskatchewan River Basin, there is little opportunity remaining for any major operation to obtain a license to withdraw water from the basin. There is a possibility this trend will continue. Depending on unpredictable variables such as future weather patterns, we may begin to see other river basins reaching their limits of available water in the next 25 years.

10. Please review the following list of options. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional opinions in the space provided.

Options *(How could we respond if river basins become fully allocated?)*	**Considerations, Possible Implications**	**Disagree**			**Agree**	
Determine groundwater availability throughout the province	Currently the provincial government does not have detailed information on the amount of groundwater available at all locations in the province	1	2	3	4	5
Allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin	Newer (junior) license holders are at risk during dry periods. No allowance for future population or economic growth. Potential pressure on aquatic ecosystems	1	2	3	4	5
Allocate water based on its most beneficial, or valued, uses	There are many views on which water uses have the most "value"	1	2	3	4	5
Allocate water to further uses even if this potentially harms aquatic environments	Aquatic habitats and species may be adversely affected to achieve further economic development	1	2	3	4	5
Set aside water for future population growth before there are any shortages	Current generations will have to live with limitations on water availability to allow for future population growth	1	2	3	4	5
Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)	Has been used in Alberta and elsewhere to solve water shortages	1	2	3	4	5
Encourage more efficient use of water through pricing to reduce overall use	Users who can create the greatest value from their water allocation will provide more economic benefits	1	2	3	4	5

		Disagree			Agree	
Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations	Reservoirs are often expensive to construct and they flood lands. Reservoir water can stimulate economic growth and reservoirs and their outflows can support aquatic habitats	1	2	3	4	5
Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)	Little information exists on the costs. Such a system has been proposed for many years to supply water from the North Saskatchewan River to the heavy oil industry in the Cold Lake Region	1	2	3	4	5
Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)	There may be ecological consequences. Little information exists on the costs	1	2	3	4	5
Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods	Does not address the risk of all water users. Individuals who have not stored water will continue to be at risk during low flows	1	2	3	4	5
Add your own option		1	2	3	4	5
Add your own option		1	2	3	4	5

water conservation

Water conservation refers to the planned protection, improvement, and wise use of water resources. It also includes controlling, protecting, and managing water. Water conservation may also mean improving the efficiency of industrial and agricultural water use. By generating the most efficient use of water, its overall productivity is enhanced and more water is made available for new operations. Increased water efficiency and water conservation plans also reduce the need for high cost expansions of water treatment and distribution systems.

11. Please review the following list of options for conserving Alberta's water. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional options in the space provided.

Options for Conserving Water	**Considerations, Possible Implications**	**Disagree**				**Agree**
Establish a price for water used by industrial and agricultural operations	Putting a price on any product encourages people to use the product wisely. At present, there is no charge to the operators for withdrawing water from a river, lake or groundwater	1	2	3	4	5
Establish a price for water used by individual households	Municipalities currently charge a fee for treating and distributing domestic water. At present, there is no charge to the municipality, or its residents, for withdrawing water from a river, lake or groundwater source	1	2	3	4	5
Educate Albertans about water conservation values and methods	Purpose would be to create a water ethic shared by all water users	1	2	3	4	5
Establish water conservation incentives (e.g. tax rebates) offered by government	May come at a cost to taxpayers	1	2	3	4	5
Set targets for water conservation for various sectors using best management practices	Targets would provide guidance for better water use within sectors but may be difficult to set across the province and between sectors	1	2	3	4	5
		1	2	3	4	5
		1	2	3	4	5

safeguarding alberta's healthy ecosystems

Healthy aquatic ecosystems are integral to Alberta's water resources. As the province's economy and population grows, aquatic ecosystems are affected as we allocate water from natural sources to human uses. Aquatic ecosystems are also affected by changes in water quality that result from human use. The Government of Alberta adopts international quality standards and monitors some portions of aquatic systems to ensure they are not being damaged by human use.

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

    Please add any additional options in the space provided.

Options for Protecting Aquatic Ecosystems	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine how much water the aquatic environment requires to remain healthy	Without this information it is difficult to allocate water without putting the aquatic environment at risk. It is difficult to accurately quantify and protect "natural demand"	1	2	3	4	5
Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin	This is generally done within a water management plan that balances the values of society. These values may change over time	1	2	3	4	5
Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm	Both point (pipe discharge) and non-point (runoff from land) sources of substances need to be identified and monitored. Non-point sources are difficult to measure	1	2	3	4	5
Identify sensitive aquatic environments or habitats that require additional protection	Without this information it is difficult to make management decisions putting the aquatic environment at risk	1	2	3	4	5
Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management	The activities that occur in a watershed, along with our decisions on land use, can affect aquatic systems	1	2	3	4	5

		Disagree			Agree	
Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use	Economic development opportunities may be lost to achieve environmental protection	1	2	3	4	5
		1	2	3	4	5
		1	2	3	4	5

additional comments

Please feel free to submit any additional thoughts or ideas you may have.

respondent information

The final questions are for our statistical calculations only.

1. Where do you live? *(please check one and provide name)*

○ City

○ Town

○ Village, Hamlet

○ Rural Resident (provide name of nearest community)

○ Metis Settlement

○ Indian Reserve

○ Other

2. What is your postal code?

3. Are you answering this questionnaire as...

○ A private citizen

○ A group or organization *(please name the group)*

○ A local government *(please name the community)*

○ A private company *(please name the company)*

○ Other

If you have answered this work book on behalf of a group, local government or company, please feel free to complete an additional work book as a private citizen.

4. If you would like to be added to Alberta Environment's mailing list, please submit your name and address. (optional)

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water for life

pooling your ideas

sub-reports

your thoughts and ideas on the future of alberta's water

Alberta
GOVERNMENT OF ALBERTA

water for life

results from completed workbooks:
copy of workbook

Sub-report No. 1
section a

May 2002

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part ⓐ

what are the challenges?

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1. Review the following list of challenges. For each challenge, indicate whether you agree or disagree with the statement.

Possible Future Challenges	**Agree**	**Disagree**	**Unsure**
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j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure	☐	☐	☐

2. Of these challenges, please indicate the three most important for the Government of Alberta to address: ☐ **a.** ☐ **b.** ☐ **c.** ☐ **d.** ☐ **e.** ☐ **f.** ☐ **g.** ☐ **h.** ☐ **i.** ☐ **j.**

3. Are there any additional challenges that should be considered?

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They are to ensure Alberta has:

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- A safe, secure drinking water supply
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- The knowledge necessary to make effective water management decisions

Alberta's water strategy will assist the Government of Alberta to make wise water management decisions, now and in the future.

4. Do you agree these objectives should guide Alberta's water strategy? ☐ Yes ☐ Not Sure ☐ No

If no, what would you change or add?

part ⓑ

achieving safe secure drinking water

Private Water Systems
Private water systems are typically found in rural areas. Because of the distance between households, it is generally too expensive for these property owners to connect to a municipal drinking water system. Therefore, approximately 600,000 Albertans get their drinking water from a source other than an approved water treatment facility. They get their water by drilling into the ground, using a lake or river, or by hauling water in by truck and storing it in large holding tanks. Sometimes a group of rural residents will establish a water co-operative that provides untreated water to its members.

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Options *(How could we respond if river basins become fully allocated?)*	**Considerations, Possible Implications**	**Disagree**			**Agree**	
Determine groundwater availability throughout the province	Currently the provincial government does not have detailed information on the groundwater available at all locations in the province	1	2	3	4	5
Allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin	Newer (junior) license holders are at risk during dry periods. No allowance for future population or economic growth. Potential pressure on aquatic ecosystems	1	2	3	4	5
Allocate water based on its most beneficial, or valued, uses	There are many views on which water uses have the most "value"	1	2	3	4	5
Allocate water to further uses even if this potentially harms aquatic environments	Aquatic habitats and species may be adversely affected to achieve further economic development	1	2	3	4	5
Set aside water for future population growth before there are any shortages	Current generations will have to live with limitations on water availability to allow for future population growth	1	2	3	4	5
Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)	Has been used in Alberta and elsewhere to solve water shortages	1	2	3	4	5
Encourage more efficient use of water through pricing to reduce overall use	Users who can create the greatest value from their water allocation will provide more economic benefits	1	2	3	4	5

		Disagree				Agree
Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations	Reservoirs are often expensive to construct and they flood lands. Reservoir water can stimulate economic growth and reservoirs and their outflows can support aquatic habitats	1	2	3	4	5
Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)	Little information exists on the costs. Such a system has been proposed for many years to supply water from the North Saskatchewan River to the heavy oil industry in the Cold Lake Region	1	2	3	4	5
Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)	There may be ecological consequences. Little information exists on the costs	1	2	3	4	5
Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods	Does not address the risk of all water users. Individuals who have not stored water will continue to be at risk during low flows	1	2	3	4	5
		1	2	3	4	5
		1	2	3	4	5

water conservation

Water conservation refers to the planned protection, improvement, and wise use of water resources. It also includes controlling, protecting, and managing water. Water conservation may also mean improving the efficiency of industrial and agricultural water use. By generating the most efficient use of water, its overall productivity is enhanced and more water is made available for new operations. Increased water efficiency and water conservation plans also reduce the need for high cost expansions of water treatment and distribution systems.

11. Please review the following list of options for conserving Alberta's water. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional options in the space provided.

Options for Conserving Water	**Considerations, Possible Implications**	**Disagree**			**Agree**	
Establish a price for water used by industrial and agricultural operations	Putting a price on any product encourages people to use the product wisely. At present, there is no charge to the operators for withdrawing water from a river, lake or groundwater	1	2	3	4	5
Establish a price for water used by individual households	Municipalities currently charge a fee for treating and distributing domestic water. At present, there is no charge to the municipality, or its residents, for withdrawing water from a river, lake or groundwater source	1	2	3	4	5
Educate Albertans about water conservation values and methods	Purpose would be to create a water ethic shared by all water users	1	2	3	4	5
Establish water conservation incentives (e.g. tax rebates) offered by government	May come at a cost to taxpayers	1	2	3	4	5
Set targets for water conservation for various sectors using best management practices	Targets would provide guidance for better water use within sectors but may be difficult to set across the province and between sectors	1	2	3	4	5
		1	2	3	4	5
		1	2	3	4	5

safeguarding alberta's healthy ecosystems

Healthy aquatic ecosystems are integral to Alberta's water resources. As the province's economy and population grows, aquatic ecosystems are affected as we allocate water from natural sources to human uses. Aquatic ecosystems are also affected by changes in water quality that result from human use. The Government of Alberta adopts international quality standards and monitors some portions of aquatic systems to ensure they are not being damaged by human use.

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

    Please add any additional options in the space provided.

Options for Protecting Aquatic Ecosystems	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine how much water the aquatic environment requires to remain healthy	Without this information it is difficult to allocate water without putting the aquatic environment at risk. It is difficult to accurately quantify and protect "natural demand"	1	2	3	4	5
Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin	This is generally done within a water management plan that balances the values of society. These values may change over time	1	2	3	4	5
Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm	Both point (pipe discharge) and non-point (runoff from land) sources of substances need to be identified and monitored. Non-point sources are difficult to measure	1	2	3	4	5
Identify sensitive aquatic environments or habitats that require additional protection	Without this information it is difficult to make management decisions putting the aquatic environment at risk	1	2	3	4	5
Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management	The activities that occur in a watershed, along with our decisions on land use, can affect aquatic systems	1	2	3	4	5

		Disagree			Agree	
Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use	Economic development opportunities may be lost to achieve environmental protection	1	2	3	4	5
		1	2	3	4	5
		1	2	3	4	5

additional comments

Please feel free to submit any additional thoughts or ideas you may have.

respondent information

The final questions are for our statistical calculations only.

1. Where do you live? *(please check one and provide name)*

○ City

○ Town

○ Village, Hamlet

○ Rural Resident (provide name of nearest community)

○ Metis Settlement

○ Indian Reserve

○ Other

2. What is your postal code?

3. Are you answering this questionnaire as...

○ A private citizen

○ A group or organization *(please name the group)*

○ A local government *(please name the community)*

○ A private company *(please name the company)*

○ Other

If you have answered this work book on behalf of a group, local government or company, please feel free to complete an additional work book as a private citizen.

4. If you would like to be added to Alberta Environment's mailing list, please submit your name and address. (optional)

Please return work book in the envelope provided by **April 15, 2002**. Work book is also available on-line at *www.waterforlife.gov.ab.ca*.

water for life

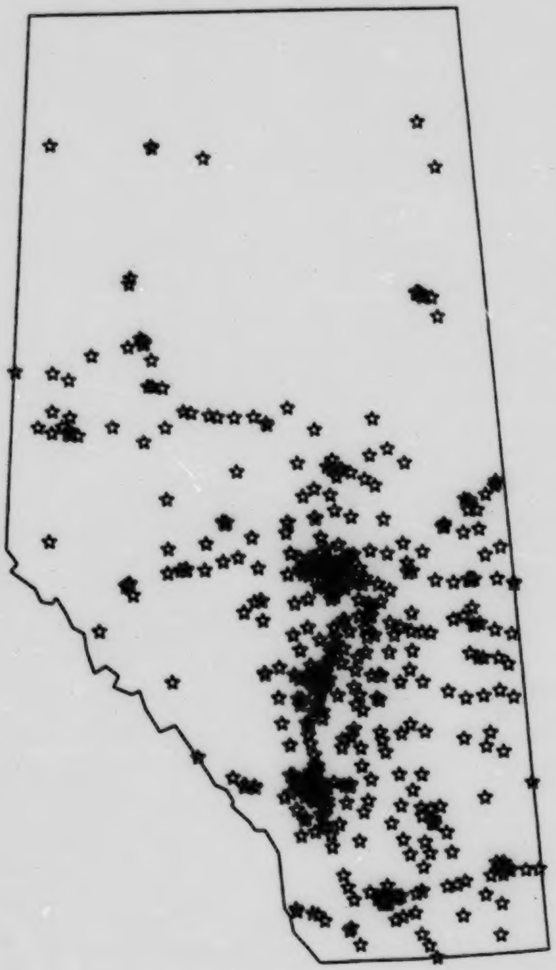
results from completed workbooks
data tables

Sub-report No. 1
section b

May 2002

The deadline for completed workbooks to be returned was April 15, 2002. Completed workbooks were accepted by the consultant at community workshops, from the postal mail and also through electronic mail (those completed on the water for life web site). A grace period of one week was given to allow for mailing of completed workbooks. The total of 2,128 workbooks were returned by April 22, 2002.

A total of 1,870 of the 2,128 respondents (88%) provided a valid postal code in Alberta as part of their respondent information. The following map is a graphic illustration of the location of those respondents. Each response is represented by an "open star" icon. The darker areas reflect multiple responses. For the purposes of this consultation, a line was drawn immediately north of Red Deer separating the province into "northern" and "southern" Alberta. Of the 1,870 respondents who provided their location, 941 or 50.3% are in southern Alberta, 929 or 49.7% are in northern Alberta.



The tables in this document describe the overall results from the completed workbooks. For each component of the workbook, the actual number of responses received is indicated by "n." **Due to rounding, percentages may not equal 100%.**

part a

what are the challenges?

1. Respondents indicated whether they agreed, disagreed or were unsure that the list of possible future challenges provided in the workbook would be challenges in Alberta's future.

table 1: possible future challenges

n		% who Agreed	% who Disagreed	% Unsure
2094	a) Water will become an increasingly scarce resource in Alberta	82	6	12
2085	b) Access to safe drinking water will become a significant issue for Albertans	88	6	6
2073	c) Water availability will limit growth in Alberta	60	19	22
2067	d) Climate change will seriously affect water flows in Alberta	62	9	29
2067	e) Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful	94	3	3
2075	f) Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth	61	27	12
2081	g) Surface water and groundwater will be vulnerable to pollution and contamination	94	3	3
2065	h) Flooding will pose a threat to human safety and create potential damage and economic costs	39	32	29
2081	i) Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important	98	1	1
1968	j) Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure	49	36	15

2. Respondents indicated which three challenges are the most important for the Government of Alberta to address:

table 2: top 3 challenges

	Times Chosen as Important	% of n (2128)
g) Surface water and groundwater will be vulnerable to pollution and contamination	1,054	50
i) Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important	941	44
b) Access to safe drinking water will become a significant issue for Albertans	862	41

3. Respondents were asked to indicate if there are any additional challenges that should be considered. Please see Sub-report No. 1 - section c - workbook comments.

what objectives should guide a future water strategy?

4. Respondents indicated whether they agreed, disagreed or were unsure that the following list of objectives should guide a future water strategy.

table 3: objectives for a water strategy

n		% who Agreed	% who Disagreed	% Not Sure
1993	• Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater • A safe, secure drinking water supply • Reliable, quality water supplies for a sustainable economy • The knowledge necessary to make effective water management decisions	87	9	5

part b

achieving safe secure drinking water

private water systems

5. Thirty-one per cent (31%) of respondents indicated they get their water from their own private system (n = 2008).

6. Choosing between 1 = property owner, 2 = shared responsibility between property owner and provincial government, and 3 = provincial government, respondents indicated whose responsibility they feel it is to:

table 4: responsibility for private water systems

n		property owner	property owner with provincial government	provincial government
2031	monitor the quality and safety of the water supply	41	49	11
1948	develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences	31	55	14
2011	develop individual water supplies (e.g. well drilling, dugout construction, water hauling)	68	30	3
1969	pump water from distant sources to dugouts during times of drought	41	50	9

small municipal systems

7. Twenty-eight per cent (28%) of respondents indicated they get their water from small municipal systems (n = 1988).

8. Choosing between 1 = municipality, 2 = shared responsibility between municipality and provincial government, and 3 = provincial government, respondents indicated whose responsibility they feel it is to:

table 5: responsibility for small municipal systems

n		municipality	municipality with provincial government	provincial government
2009	supply technical advice to small municipalities about facility operations, maintenance and monitoring	10	52	37
2005	monitor the quality and safety of water at small water treatment plants	18	59	23
1995	develop regional water supply systems	11	71	18

9. When asked whether (public or private) companies should be allowed to invest in water systems and provide drinking water to small municipalities, respondents were evenly split in their response (49.6% said yes, 50.4% said no), n = 1703.

reliable, quality water supplies for a sustainable economy

10. On a scale from 1 to 5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree and 5 = Strongly Agree, respondents indicated their level of agreement with a number of statements describing options for future allocation should river basins become fully allocated.

table 6: options for future allocation

n		% who Agreed or Strongly Agreed	% who Disagreed or Strongly Disagreed	% Not Sure
2056	determine groundwater availability throughout the province	74	12	14
2040	allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin	25	53	22
1999	allocate water based on its most beneficial, or valued, uses	54	26	20
2057	allocate water to further uses even if this potentially harms aquatic environments	7	86	7
2039	set aside water for future population growth before there are any shortages	65	18	17

n		% who Agreed or Strongly Agreed	% who Disagreed or Strongly Disagreed	% Not Sure
2046	allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)	65	22	14
2036	encourage more efficient use of water through pricing to reduce overall use	60	27	13
2041	investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operators	57	27	16
2047	investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)	24	56	20
2057	investigate construction of open diversions from one river basin to another (water goes directly from one river into another)	17	70	12
2028	companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods	46	33	21

water conservation

11. On a scale from 1 to 5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree and 5 = Strongly Agree, respondents indicated their level of agreement with a number of statements describing options for the provincial government to encourage water conservation.

table 7: options for conserving water

n		% who Agreed or Strongly Agreed	% who Disagreed or Strongly Disagreed	% Not Sure
2038	establish a price for water used by industrial and agricultural operations	68	22	10
2025	establish a price for water used by individual households	50	36	14
2055	educate Albertans about water conservation values and methods	96	2	2
2025	establish water conservation incentives (e.g. tax rebates) offered by government	68	17	15
2013	set targets for water conservation for various sectors using best management practices	79	7	14

safeguarding alberta's healthy ecosystems

12. On a scale from 1 to 5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree and 5 = Strongly Agree, respondents indicated their level of agreement with a number of statements describing options for protecting aquatic ecosystems.

table 8: options for protecting aquatic ecosystems

n		% who Agreed or Strongly Agreed	% who Disagreed or Strongly Disagreed	% Not Sure
2054	determine how much water the aquatic environment requires to remain healthy	90	3	7
2027	determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin	82	8	10
2031	determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing harm	88	6	6
2052	identify sensitive aquatic environments or habitats that require additional protection	92	3	5
2047	develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management	93	2	5
2035	maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use	81	9	10

additional comments

Please see Sub-Report No. 1 - section c - workbook comments.

respondent information

Respondents described themselves in the following manner. These results were used for cross-tabulation purposes only.

45%	live in cities
21%	live in towns
6%	live in villages or hamlets
27%	live in rural areas
<1%	live on Indian reserves
<1%	indicated "other"

86%	answered as a private citizen
4%	answered as a group or organization representative
6%	answered as a local government representative
2%	answered as a private company representative
2%	indicated "other"

water for life

results from completed workbooks

comments

Sub-report No. 1
section c

May 2002

This document contains comments provided by respondents in the completed workbooks. Comments are presented in order of the workbook topics and are grouped into three sections: comments from respondents north of Red Deer, comments from respondents in Red Deer and south, and comments from respondents that did not indicate their location.

part a

what are the challenges?

1. Review the following list of challenges. For each challenge, indicate whether you agree or disagree with the statement.

A number of respondents chose to comment on possible future challenges presented in question 1.

a. Water will become an increasingly scarce resource in Alberta.

north of Red Deer

- Concerns me in regard to habitat and ecosystem impacts.
- Should only be "effective water management" the investment is one of many possible actions.
- Dams and infrastructure are definitely not the way to go.
- Limited number of dams - if only a few people are helped the huge cost is not warranted. Move the industry.
- Although the dams that exist must be properly maintained.
- It depends on how we use it.
- It is not a resource and should not be sold. If it continues to be abused.
- I strongly disagree with dams and other infrastructure management plans. They are extremely expense and damaging to the environment. We should find a way to live with the water cycles we have, rather than trying to manipulate nature.
- This is a global issue.
- Effective water management will require innovative approaches to demand management not increased supply.
- In some parts of Alberta (e.g. Southern Alberta surface draining also significant).
- Dams are devastating on the environment and should not be a consideration. Development should be limited by current supply without significant infrastructure.
- Water is renewable and will only become scarce if we waste it or destroy the environment.
- Dams and canals will allow poor management of water to continue for a few decades.
- In water management we need good solid data prior to constructing dams. We also, need to develop strong policy and legislation on water usage.
- More in southern portion of Alberta, south of Red Deer to border.
- Let us use what we have with wisdom – less waste.
- The amount of water available will not go down significantly but demand will go up significantly.
- Depends on who thinks they need water "diverted" to them and who'd profit.
- Dams are not the answer.
- Dams create problems as well as dikes and marinas.
- Do appropriate industrial activity for dry areas, instead of trying to create oasis in a desert.

Red Deer and south

- Look at the Oldman dam. Let us live within our natural aquatic means, avoid additional ecological damage, high costs and increased evaporation.
- Restructure priorities – no license to waste.
- Rather than funneling water from north to south we need to reduce and reuse what we have. The addition of wetlands will store water with less ecological impact than dams.
- Water may become a scarce resource if it is not managed properly, if there is a continued or frequent drought and if we choose to use water in a manner that we are doing now, such as excessive use in households, in industry, on farms, and excess waste of water.
- However, this should be looked at as long-term planning and problem areas should be identified and prioritized. This will enable government to identify where they need to place immediate financial resources and where they can continue to plan for the future.
- Dams are not always effective.
- I assume this statement means there will be more competition for the available water supply, not that there will physically be less water.
- I agree that investments will have to be made, but why choose to list as an example just dams? Why not improved sewage treatment plants, other water management facilities? Or were you just looking to get out of making investments by having respondents think you meant dams?
- Depends - supply may require dams; quality will not need dams.
- If a careful approach is considered, there is no reason that Alberta needs to flood miles of stream for other users. Typical government policy on water management has failed to address the big picture. Do we need more dams? Possibly. I am not inherently against dam building, but I wish that the government would make decisions that took into account all variables. Perhaps this sort of workbook is the first step.
- I am against further major dam development. They create other problems. I would encourage exploring other storage options; such as those that nature may provide the clues to. If one looks for them (e.g. storing water in subsurface gravel beds).
- For southern Alberta, more dams will do as much or more harm than good.
- Depends on whether water becomes a saleable good.
- Dams are rapidly being abandoned in the U.S. and are extremely expensive. They also provide a place where rapid recreation growth will take place and take precedent over the original reason for the dams, causing problems the original dam wasn't designed for.
- Dams are not an efficient way to manage water.
- Do your homework. Why major infrastructure changes? More natural means.
- Effective conservation measures would significantly reduce the cost of infrastructure. Forget dams!
- If we fail to practice conservative water asset management and to preserve environmental systems
- Wise use does not require major investment.
- I'm not in favour of investing in infrastructure for dams, but what if infrastructure includes water treatment? Then I am in favour of these investments such as regional water treatment programs.
- Yes, water quality, regional sewage. Better care of riparian areas. There is a cost. No, dams redirect.
- A costly and small-minded approach. Be innovative and live within limits of the ecosystem.

did not indicate location

- Water will become more scarce because of over-allocation, global warming, and mining of groundwater.
- Another frightening question - this item suggests that the people who profit from dams had a large part of the "ideas" generation. We are at a stage in the world where we recognize that too many dams have been built, at enormous economic and ecological and social costs. We are at the stage where we recognize that many dams must be removed, not new ones built. In Alberta we have dams that we have not even assessed if they were successful in achieving the stated aims (the appearance is that the Oldman hasn't even come close). The Meridian dam was exposed as a financial disaster and shelved, without even counting the ecological disaster it would cause. The idea of inter-basin transfer is the DEFINITION of an ecological disaster, and the Premier himself has dismissed the idea. Why is this item even here, unless it should say DISMANTLING of dams? This is why I have disagreed: there should be

NO NEW dams. Maintenance of dams that PROVE themselves through open, public assessment of costs/benefits is the only cost we should entertain. The costs of dismantling dams would be welcome. This question also seems to discount the enormous costs for municipal infrastructure maintenance. The bouncing of this political "hot potato" between the province and municipalities will, in my opinion, lead to human casualties because of the continued neglect.

b. Access to safe drinking water will become a significant issue for Albertans.

north of Red Deer

- No different from other municipals (Walkerton, North Battleford, etc.).
- Not if we manage our water i.e. no sewage in our rivers.
- Not if we are careful and do not pollute it.

Red Deer and south

- If we continue to deplete and contaminate aquifers.
- I think it already is.
- This is only true if we charge nothing in our approach to water quality and quantity.

did not indicate location

- Access to safe drinking water IS already a significant issue.

c. Water availability will limit growth in Alberta.

north of Red Deer

- I don't think it has to if we change our ways of using water.
- Go where the water is – but this not necessarily a bad thing.
- There comes a point where growth will not be sustainable.
- Industrial users may be challenged.
- This is likely to affect parts of Alberta more than others. Availability will also limit intensification of use in certain areas. If we plan for smart growth we should be able to expand within the limits of our aquatic ecosystems.
- Economic growth should not be the measuring stick. We must protect our unspoiled land and increase protected areas and then protect them and not allow industry to do what they want. We have water but [also an] increase in contamination by industry, agriculture and poor ability to fine businesses who disregard current rules and dump toxic waste improperly into waterways.
- This may not be a bad thing.

Red Deer and south

- What kind of growth?
- Type of growth must depend on water available.
- If water becomes a "good" it could become very scarce..
- If you sell it, it will.
- This depends on how we manage our water.
- This is completely dependent on the nature of this growth. It certainly may limit agricultural growth, but sustainable, water-sensitive growth may be valid.
- Depends on the type of growth. Agriculture-yes, Population- no.
- I do not think that availability need limit growth, but changes in how we manage water will have to take place, as such, I am unsure, as I am unsure about what changes might be implemented.

- I believe water availability may limit growth in only certain areas of Alberta, other areas may never be a concern.
- Again it will depend on how we continue to use water and if we have a continued or frequent drought.

d. Climate change will seriously affect water flows in Alberta.

north of Red Deer

- Attached is a Climate Change Discussion Document – I have prepared and have been discussing with individuals in Alberta Environment, Climate Change Central, Pembina Institute, Environment Canada and others. My concern is that wasteful use of water causes regional and local climate changes. So far this has not been refuted but has not been communicated publicly. Water use adds 9000 ExaJ and 4500 GT of water to the atmosphere from only 1% of the Earth's area versus 40,000 ExcJ from global warming due to greenhouse gases. The water likely does not add to the warming globally but should cause the intense local and regional changes. More later as this develops.
- Cyclical ? droughts ? strategies mean better risk for users.
- What is the impact of climate change? Is there in fact a climate change underway?
- The effects are uncertain right now but we should prepare for drier years ahead.
- I keep hearing comments from government that climate change is not proven.
- Alberta needs to act now to reduce greenhouse gas emissions.

Red Deer and south

- Climate has already changed.
- Declining glaciers will provide less source water - that is happening now and has been for quite some time.
- Climate change may be taking place, but I am unsure what that means for precipitation, I think I understand that evaporation will/could increase, but will there be less precipitation and changed stream flows? It is a good question.
- Climate change can increase or decrease surface water flow, this is not always negative.
- The Climate is unpredictable, if there is a trend that is causing water flows to be affected then we need to address it (e.g. climate warming may affect precipitation then concentrate on the factors that increase temperature as well).

did not indicate location

- Water availability MUST limit growth in Albertans. It is suicidal nonsense for anyone to suppose that humans can continue growth indefinitely. We have reached, most likely passed, the stage at which the province should be aiming for STABILITY, not growth. Running out of water (which has occurred in many places in Alberta) is a biological sign that we have passed the limit.
- It is going to happen, we can't control it. What we can control is human activities and decisions.

e. Industrial and agricultural growth will create greater demands for water – not always in places where water is plentiful.

north of Red Deer

- Water availability may pose problems for growth in southern Alberta. However, if new development is directed to the northern areas where water is available maybe that would take the pressure off the southern water concerns.
- We in rural northern Alberta have more resources for living and processing than does the south half of this province. With this in mind, it is my feeling that we will now lay claim to our development and prosperity. No water shall go south, investment shall go north. The population of Alberta will shift, not the

resources. If Calgary and south have water and ILP problems, fix them, but stop whipping the rest of the province. Get over your "little Ontario attitude." We owe you nothing. You have never seen conflict in Canada like you will see if you try to rape us of our water. I consider all the water on my land as mine to use - the excess goes to the streams and lakes - it is not yours to tax, sell or limit. Southern Alberta has screwed up: moving water south only compounds the problems.

- Start to encourage development where the resources are. There is still land, water, oil, gas, timber and people north of Red Deer.
- Tax breaks for industry, what for farmers?
- Learn to live with what nature offers.
- Perhaps we should be promoting industrial/agricultural growth where the water supply is rather than diverting water for that growth in areas where the water availability does not exist. Develop where the resources are. Do not divert resources just because someone needs it for industry.
- Any growth that does not take into consideration the local sustainable water resources should be allowed to go out of business, and not be supported by others who do take into account where water is and how valuable it is.
- Use of waterless technologies.
- We should not allow that to happen.

Red Deer and south

- Too bad – go to the water!
- True, but should we move the water or develop where there is water.
- Not if type of growth is controlled.
- We will drain central Alberta for irrigation to the south? and for oil field injection?
- There are regions where ample water is usually available. More effort should be made to encourage agricultural production there instead of the barren lands of southern Alberta. Industry should move to water, not water divert to industry.
- Why does industrial and agricultural development occur in areas with little water and susceptible to drought? Be sensible and develop only to the capacity that the land/water can support without changing/impacting the ecosystem. Irrigation in southern Alberta is an example of something that should not have happened. Develop agriculture and industry where there is sufficient water; leave the areas alone that cannot support industrial and agricultural water use.
- Agricultural and industrial growth certainly has the potential to place greater demands on water. Water management agencies like Alberta Environment need to work closely with local authorities before new applications for agriculture or industry are granted.
- Industry and Agriculture may not grow due to market forces. For example the drought caused the sale of tens of thousands of livestock over and above what is normal for fear of pasture loss and expensive feed.
- Especially with intensive agriculture operations (ILOs)
- Urban political power is greater than rural so we will continue to see the rural users sacrificed. Don't let it happen! Part 1.e. industrial, agricultural should be separated not grouped together. They are so different! Urban people reading that would not see the difference!

did not indicate location

- I have said that I disagree with this because it is patently ridiculous for industry and agriculture to increase demands for water where there is none. So industry and agriculture must not be allowed to demand more water - we must live within our means or suffer the biological consequences, such as catastrophic water shortage.
- Agricultural growth will be limited without good water supply.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth.

north of Red Deer

- Not if the government does its job.
- Badly phrased as an either/or question, with no direction to it. How can I rate it on this scale meaningfully? It is the most important decision to make but which way? If it is aquatic ecosystems then it is TOP. If it is economic growth then BOTTOM of the list.
- A sustainable environment is necessary for a sustainable economy. Albertans Have to plan more carefully so both the environment and the economy can be maintained.
- Growth will be sustainable dependent upon water availability. Growth should not take priority over aquatic ecosystems however, sustainable growth not at the expense of aquatic ecosystem.
- Why either/or? If we don't have aquatic ecosystems, we have nothing.
- Albertans will need to plan and manage for environmental sustainability so as to maintain the economy over the long-term.
- Poorly worded. We need to find the correct 'balance' right now – too much emphasis on growth.
- I don't think it has to be this way. We can sustain our aquatic ecosystems and still grow economically but we will need to change our ways in order to do this. So I don't think we should have to be forced with this choice.
- A sustainable environment goes hand in hand with a sustainable economy. We need to plan wisely to maintain both.
- Rewrite to read "Albertans must learn to plan economic growth in such a way as to ensure preservation of aquatic ecosystems."
- Correct. We choose sustainability of aquatic ecosystems.
- If we do not have sufficient quality of water for aquatic ecosystem all life will soon cease to exist.
- Albertans will choose between waste and wise use.
- No, there should be protection for fish, etc.
- On the current path, yes, we can't sustain growth and maintain ecosystem integrity; but with more innovative economic paths, we can.
- Yes, how can we use our water to make money without wrecking the environment, deciding if economy is more important than the people it's going to make money for.
- We need to find a mode of development in which the needs of the earth are honoured and respected. Environmental protection helps economic growth because it gives us safe water, recreation opportunities and better health.
- We need to balance economic growth and environmental integrity.
- The challenge is not to decide between ecosystem health and economic growth but to manage economic growth in a way that will not affect ecosystem health.
- A key point. We need to take the perspective that healthy aquatic systems are a necessary prerequisite to healthy economies - not one pitted against the other.
- But economic growth is not necessarily desirable.

Red Deer and south

- Stupid and unenlightened assumption! Need to get past this simple-minded and polarized thinking.
- Aquatic ecosystems must be sustained. Polluting industries e.g. pulp mills, refineries cannot keep increasing.
- What kind of economic growth?
- Depends on type of growth - water intensive or water non-intensive growth.
- A sustainable environment is necessary for a sustainable economy. Alberta must plan carefully so both the environment and economy are maintained.
- "Choose between" - but we haven't yet "used wisely" so if we can balance, it may be doable. Right now we don't balance, we tip for economic growth over ecosystems.

- Lose ecosystems and you lose economic potential. We can't choose between them.
- Perhaps in the sense of many economic activities which are not water sensitive.
- I would like to emphasize that I feel all the above challenges are important and need careful consideration. Challenges for society/industry/governments etc. are to quit "pitting" economic growth against environmental sustainability. Our challenge is to change our attitude to a healthier and more positive response, where economic and environmental sustainability are viewed as compatible and promoted as an "accepted way of life." An excellent example of this comes from many of the "grass-roots" groups like the Cows and Fish program, that have demonstrated through education, awareness and cooperation industry and the environment can exist together. Another challenge is to stress the importance of preventing/minimizing water pollution and protecting our water supplies before they reach high contamination levels, perhaps through legislation or policy?
- How can there be economic growth without ecosystems?
- It would be unwise to choose economic growth above aquatic systems.
- If you destroy our ecosystem, you will destroy economic growth!
- My choice is sustainability of aquatic ecosystems.
- I find the question offensive, it suggests that you can have one or the other, but not both. I strongly disagree. With the right approach and measured trade-offs. Alberta should have sustainable ecosystems and a strong economy.
- I think you have to have both economic stability and sustainable ecosystem. You can't chose one or the other. We need to get ride of this mind set and spend our resources developing economic/environmental models to ensure healthy communities.
- I disagree that Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth in most areas of Alberta providing we start now to manage our water.
- Why do we have to choose? Lets work to achieve both.
- This point is potentially misleading. On one level, the choice is necessary and obvious. Ultimately, however, there really is no choice. If aquatic ecosystems are not sustainable, growth and health will be limited whether we agree or not. We need to accept some realities in the world.

did not indicate location

- Bad question - we need both - the answer is balance.
- This question bothers me the most - it purports to separate humans from the rest of biology. We must get it through to decision-makers that people are biological entities - we need water to live, and we need a healthy biological environment to provide life-giving services, such as cleaning our water, recharging our groundwater, etc. Albertans CANNOT choose between life and economy! One only needs to look at the Aral Sea disaster to understand that keeping a healthy aquatic ecosystem is vital to human health. This question belies a FUNDAMENTAL lack of understanding on the part of the people who generated these ideas. It is a frightening question.
- Environmental impact and economic growth must and can be balanced.

g. Surface water and groundwater will be vulnerable to pollution and contamination.

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- Storm system water should be cleaned before entering our water system.
- Surface water and groundwater are already polluted.
- Depending on operations conducted near water.
- Already seeing this in agricultural areas with pesticides, etc.
- Only if we allow pollution.

Red Deer and south

- It would be the result of very poor policy and management that would lead to pollution and contamination.

- Already is a serious problem.
- Municipalities including cities need to start protecting the groundwater even though it may not be used for potable purposes in the city. Ultimately, some of the groundwater under the city ends up in a surface water body. If the groundwater is contaminated, it adds to the impacts on the surface water. Municipalities have a concentration of activities that contaminate the groundwater. Municipalities need to implement stronger policies and bylaws to complement provincial legislation.
- Mega feedlots and intensive hog and poultry operations are going to pollute our water supplies.
- I feel the potential for groundwater pollution and contamination is huge. We need to put in place strict regulations that allow only trained/certified professionals access to our groundwater. We need a re-certification program where Journeyman Water Well Drillers who have not worked in the industry for five years have an opportunity to update on environmental issues and new regulations or requirements (by written exam and license renewal?). We also need to apply these rules for Water Well Tester, Pump Installers, etc. Another large area where there is potential for pollution and contamination is the existence of numerous old, unused and unsafe water wells throughout Alberta. It is important we address this problem as quickly as possible - perhaps a well abandonment program should be implemented.
- People are becoming more aware of the affects of pollution to water systems so system may not become affected.

did not indicate location

- Surface and groundwater ARE ALREADY contaminated. A recent report cited staggering statistics for Alberta's pollution rates with respect to coliforms and nitrates. So I agree with the statement because it is already true.

h. Flooding will pose a threat to human safety and create potential damage and economic costs.

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- Stop building on flood plains.
- Stay out of flood plains!!
- Only if diverted and dammed.
- Deny building permits to developers who even think to tread on sensitive areas; home builders especially.
- Flooding is natural, live with it.
- Flooding will result from excessive forestry and canopy removal along East Slopes and Boreal Forest.
- The real issue is the use of flood plain and flood way. We need to better define and protect the flood plain and flood way and not allow development, modification or infill. These areas need to be defined as crown land thereby protecting against floods and contamination.
- Some flooding is necessary to maintain healthy river systems. We need to limit/reduce flood plain occupancy and development to limit damage/cost of floods.
- Humans do not belong on the flood plain of rivers.
- If development occurs in flood plains.
- No building on flood plains - no dams are required

Red Deer and south

- Not if you manage flood prone areas. A land use planning issue.
- Not all flooding is bad
- This natural occurrence has in many cases positive effects. Flood plains should be respected. Expensive river controls should be done, if at all, with prudence.
- Flooding always poses a threat.
- How do you know whether there will be floods, droughts or both?
- It will to those especially within a 100 year flood plain.

- Yes, because someone built in an area should not imply controls.
- Being from flat land country in southern Alberta the only experience I have with floods is watching them on TV.
- There are cases around the world were flooding occurs every 100 to 200 years it is a fact of life that we have to be aware of, it may or may not be as frequent. I think flooding is one of our least worries as a province compared to coastal and low land areas.

did not indicate location

- The potential is harmful, but it is important for ecosystems? So we can sustain what we have.
- Flooding will pose a danger because of climate change, deforestation, dam construction, allowing structures to be built in flood plains. Floods are natural and we should plan for them, not try to control them. Dams make the situation worse by making us believe that we are somehow protected. There will always be a flood event that exceeds any dam's capacity, and consequences can be catastrophic if a dam structure is compromised.
- Flooding and damage will continue being a threat in Alberta, especially as these areas become developed. Flooding is naturally occurring, but the problems are often exacerbated by human activities, namely shoreline development and upland area clearing. We need to ensure that riparian areas are kept intact in order to naturally minimize the effects of flooding.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important.

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- Had been important for a long time.
- Re-education at school levels.
- If we do not know what we have how can we plan?
- I would have put "i" as important except that I think that knowledge about Alberta's water systems and knowledge about how to use water wisely has always been important. A deeper understanding of aquatic ecosystems needs to be understood through research. A healthy ecosystem is a productive ecosystem.
- It already is important.

Red Deer and south

- It has been for many years.
- If you don't know what you have how would you know what you are dealing with?
- The key is for policy and decision-makers to understand the value of knowledge (and scientific knowledge) and use that knowledge (that currently exists globally with regard to water management).
- In order to make effective use of the water that is available we need to have the best possible information on the water systems, and what is available to be used. This can be accomplished through well designed and operated monitoring networks.
- I believe it is necessary to educate the public now as opposed to only in desperate times, of the importance of conserving water, and how this can be achieved. Understanding that municipal use comprises a small proportion of water use in the province, I believe that water meters are one effective way of ensuring that Albertans and Alberta businesses are made aware of, and accountable for, their water use.
- I disagree with the question in that "knowledge about Alberta's water systems.....wisely" is important now!
- With more education, some other important factors will be subsequently addressed i.e. water availability limiting growth and flooding posing a threat.
- It is vital to have a well-informed public, stakeholders, politicians and decision-makers, but they need to be open to new ideas.

did not indicate location

- Important now - will be more so in future. Legislation or education - or a combination of both. Environment tends to suffer in the ILO. Important that government react mindfully to knowledge - i.e. folly of grandfathering of insufficient handling of sewage. Focus must be on other than residential as well.
- Obviously everyone should agree with this, but I should add that knowledge IN COMBINATION with management that obeys the PRECAUTIONARY PRINCIPLE (i.e. in the absence of evidence, assume the worst and act with utmost caution) is the sensible procedure. I would also add that I read "use water wisely" as is the same as "conserve water."
- How do you convey the message to the person who likes to shower two times a day, change and wash clothes daily? Challenge would be how can you change people's habits? How can you ensure a steady supply of fresh vegetables each day? Can each person set their desires lower on having the freshest of vegetables, as there is not enough water in winter to grow the vegetables in southern countries. People will have to rely on canned vegetables, etc., or other ways to remedy water availability.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure.

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- The infrastructure investment should be in municipal water/sewer plant upgrades and in grants for installation of rural water co-operatives in areas with no or inadequate groundwater.
- Water management – draws on rivers that are fed from mountain run-off.
- What about other water conservation infrastructure such as grey water systems or drip irrigation for agriculture?
- Don't need more dams, need better conservation.
- No more dams! They are inefficient and worldwide have been shown to be, in the long-term, extremely damaging.

Red Deer and south

- This question is very slanted. I don't believe that we have enough information about water management possibilities at this stage to answer this. HOWEVER, it should not be assumed or suggested that a valid strategy must be infrastructure (dam) oriented.

2. Of these challenges, please indicate the three most important for the Government of Alberta to address.

A number of respondents chose to comment on question 2.

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- All priorities.
- Prohibit non-renewable use of water. Water conservation (both ground and surface water) and reducing pollution.

Red Deer and south

- Most of these "challenges" are givens that the government doesn't need to address. It needs to acknowledge that they exist today.

3. Are there any additional challenges that should be considered?

Respondents were asked to provide a written response to question 3.

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- Sustainable funding for infrastructure and regional water systems will be increasingly important.
- The demand for water in the U.S. may create a situation where they are willing to pay more for water than residents in Alberta can afford to pay.
- Sustaining Alberta's aquatic ecosystems should be a priority.
- Re-establishing and improving healthy riparian area.
- Funding sources for infrastructure.
- Depends where you live in Alberta
- Ensure that decisions are made on sound science and not free and speculation.
- Water diversion in some areas may help to sustain levels in some of our lakes in central Alberta.
- Revenue sources need to be identified now to pay for the infrastructure required in future.
- Government funding, national planning.
- We will have to limit the amount of people we bring into our country. Control water going into the U.S.
- Excessive usage areas need to be able to account for their over usage compared to rest of province (irrigation).
- Definitely the establishment of dams for reservoirs in the south and southwest areas of the province.
- Check Hutterite colony at Ferry Bank for hog effluent and dumping of spray containers in Battle River.
- Water conservation should be practiced by all Albertans.
- Safe groundwater for the future. Control intensive livestock operations to protect our safe drinking water supply.
- No more large feedlots or hog farms.
- Potential limits on domestic consumption for municipalities. Need to look at better reuse of water.
- The destroying of swamps, contamination of groundwater, controlling and diversion of water (i.e. creeks and rivers).
- Pollution from hog farms and large cattle feedlots has increased and must be controlled.
- Demands on Alberta's water supply from outside the province
- Green infrastructure funding should be readily available for projects that are innovative and effective at conserving water.
- Fresh water injection - waste of water should not be allowed. Wetland Management.
- More efficient and effective use of water by agriculture and industry. Conservation is also important for municipal use. The needs of the environment should not play a secondary role to the needs of business.
- Treat water for the real value it is.
- Energy sector (oil patch) is pumping potable and salt water underground, never to be recovered again (contaminated).
- I would suggest water is a precious renewable resource as livestock numbers increase dramatically, with the introduction of CFOs into agriculture and high population density, along with global warming and receding glaciers.
- Limit growth around lakes and along rivers. Residential and agricultural to preserve water quality and crack down on run-off already going into these waterways by agriculture and sewers.
- Oilfield activity going through aquifers as well as consuming potable water to service underground activities.
- Old seismic holes on old right of ways should be repaired.
- Economic cost to develop water supply for East central Alberta.
- Most of these questions are classic no-brainers. You forgot to ask if Albertans agree that water in Alberta should be a commodity for sale to the highest bidder as the present policy. DISAGREE, PROVINCIAL OWNERSHIP.
- I believe irrigation and changing of water courses to be monitored or frozen, as well as industrial use of

water (i.e. water being used in *oil industry, paper, etc)*.

- Send the Hardisty Taiwan pig barns to Fort Chipewyan.
- Effective management of water and infrastructure to make best use of land base and spread economic benefit to poorer areas of province.
- Plant more trees in agricultural areas around towns to prevent run-off and liquid fertilizers from and on farm land near communities (pig wastes on surrounding land near villages, towns or cities that pollutes our water intake). Every tree planted will help improve conditions.
- Demand on Alberta water from the U.S.
- The disparity between urban and rural people in terms of voting power, vulnerability to any changes made - rural people will be asked to bear a larger burden in terms of having their lives and livelihoods disrupted so that urban people can continue their wasteful lifestyles without disruption.
- Divert water flow from northern Alberta to the south.
- Urban [dwellers] feel rural [dwellers] use too much water and vice versa. The government has a major role to play in education.
- Effective value system is required to ensure that available water is used for the most beneficial programs. Providing excess water for irrigation is not as effective as ensuring adequate water remains for the ecosystem.
- Fresh water should not be used in the production of oil. Oil is a great resource but we can live without it, we can't live without water.
- As with most issues, the challenge will be to manage the resource based on sound scientific principles.
- Wildlife and more diseases.
- If we use water wisely in Alberta and manage water effectively, I believe we have adequate water in Alberta.
- How do you plan on determining for certain water challenges ten years from now? Rainfall and snowfall are not really predictable. Perhaps we will receive sufficient rainfall, even in the Palliser Triangle, which was considered uninhabitable just a few generations ago.
- Drainage and redirection of water and the negative effects on aquatic environments. Education of the public regarding water conservation, water quality and sustainable water management.
- Water conservation, both quantity and quality, preservation of charge and discharge areas, large and small.
- In the area that I live there are many lakes that are incapable of supporting fish. This I am told is due to stagnant conditions that exist in these "lakes." Many of the natural creeks and streams that fed these lakes have dried up. I believe that this is an area of water management that has not been looked at. Improving the quality of the water in these lakes (Cooking, Miquelon and Beaver Hill) would increase recreational opportunities plus a better water source would also be available in these areas.
- IFOs should require their own source of water and not depend on the aquatic ecosystems.
- There should be regulations and enforcement guiding water usage. Without penalties, irresponsible water usage will continue. As great as the oil industry is for Alberta, they should not be allowed to pump potable water down oil wells.
- Enforcement of present regulations against industry (i.e. why isn't seismic made to plug holes from bottom to top like the Act says, number 38C in water aquifers). If water well drillers drill a dry hole, they must plug, but not industry? This proves that industry tells the government what to do and the government does it. But they are not responsible and should not sell our fresh water supplies to the U.S.
- The value and role of watershed planning and wetland retention/restoration in addressing these challenges.
- Demand for a natural setting in rural areas will increase out of proportion to the ability of farmers to make a living off that land.
- ILOs should be considered as to where they are set up and as to possible groundwater pollution.
- There will be an increasing challenge for Alberta to "sell" its water to the US.
- There needs to be better information on the longevity of the aquifers. The technical people tell us there is enough water below but for how long?
- Selling Canada's water.

- The destruction and removal of water bodies by agriculture and industry.
- Intensive livestock operations - locations and impact on water sources - mostly on groundwater, but also on rivers and creeks. Strict monitoring is a necessity by government in consultation with local municipalities.
- Selling water.
- The change in government departments from help and advice to monitoring only prevents individuals from organizing help needed to take care of water resource.
- Who will have priority of water, agriculture or industry when the water supply becomes more scarce.
- Affording water systems for rural Albertans.
- Efficient use of available resources. Enforcement.
- Stop hail suppression.
- Stop deep well injection of potable water for industrial purposes.
- Existing wetlands should be protected and not destroyed.
- Population trends moving toward areas of inadequate water supply.
- Establish local commitments to water conservation initiatives, priorities.
- All areas of the province must utilize means of storing water to be used when time of low flows. More dugouts, small dams and creeks, flood wetlands, build aquifers around wetlands.
- I have been following climate change but find research inconclusive. No doubt it will affect water but I can't say from my reading that it is now affecting or will seriously affect flows.
- Albertans will have to achieve a sustainable balance between protecting and maintaining ecosystems and economic stability and growth.
- No export of any kind should be considered when the U.S. asks for Canadian water. Our water is becoming an issue already and we do not need to place even greater demands on a threatened natural resource. Our natural resources have been exploited enough by Americans.
- Encourage new industrial consumers to locate in under-utilized water areas.
- There may be increasing demands for potable groundwater, this may add additional dollars and technology in order to benefit from groundwater.
- Regulate the opening and use of land that requires irrigation to produce.
- Link management of the provincial water supply to other ecological resources (i.e. fish, wildlife, riparian management).
- Water is basic to every individual of every form of life. More to the point it is basic to every person's survival and quality of life. As such the management of water resources becomes a surrogate for applied democracy. How we deal with water allocation issues will become the basis for political success or failure. Rural vs urban and industry vs agriculture are important issues to be sure, but 300 million Americans vs 30 million Canadians and corporate control vs democratic control will be the divisive issue.
- Water to U.S.
- There are areas where water supply may not be what is expected/wanted, but also areas where supply is plentiful. Be careful of blanket policies.
- Efficient use of water, priority #1.
- Water quality in smaller communities and on reserves should be guaranteed safe - that means training of waterworks personnel.
- Diversion of water to U.S. should not happen.
- Supply of good quality water to municipalities located away from source (rivers or lakes) via pipelines is very costly.
- Affecting the ecosystem by using too much water. Making oil companies not use water for injection.
- Pollution from feedlots and livestock left to run right into creeks and rivers.
- The past practice should be identified before future plans should be made now.
- Industrial permits approved separately - accumulated effects are not dealt with or looked at.
- Groundwater contamination through feedlots and industrial pollution.
- Responsible water management for future sustainability for Albertans.
- Water conservation.

- Government monitoring of industrial sites. No more honour systems!!
- Many errors have been made in the past, land sold on flood plains has resulted in the need to mess with our rivers. I think of the west end of Lesser Slave Lake, the Kinuso area, the Lesser Slave River with the channel work and weir, etc. The message is "don't mess with mother nature," but I am afraid it is too late.
- The questions or list of challenges are slanted toward the "agree." These are all important issues.
- Government representation of rural and northern Albertans
- Water exports. Water pipelines for irrigation.
- Exploration of new technologies to reuse effluent from industrial/agricultural sources.
- Sustainability of ecosystems in undeveloped areas (i.e. northern Alberta, BC and Saskatchewan).
- Most if not all these questions the word "will" could be placed with "is" (e.g. item 6 is already happening now in a major way).
- Grab from southern Alberta for water from the north. Should not happen. No inter-basin transfers. Waste treatment plant. Polluting surface water.
- Water should not be moved (pipe diverted, etc). Agriculture and industry should move to the resource. This would help disperse high-density development. Urban areas should be encouraged and educated to use less water for aesthetic purposes.
- Education of industry of the effects of improper practices on seasonal drainage and intermittent creeks, specifically how erosion or pollution in these seemingly inconsequential watercourses can have major impacts on the larger watercourses they eventually drain into. I find people saying "Oh, it's just a beaver flood or muskeg" but they don't realize what they do there affects the large permanent or recreational fish bearing lake that it drains into miles away.
- Effective water management will require significant investment in educating Albertans in water conservation measures.
- Preservation of Alberta's water for the future use of Albertans should be one of the major considerations.
- Legislation - some change to accommodate different regions within Alberta. What works in the south may not be right for the north.
- Effects of diversion or damming to environmental systems (e.g. delta systems, aquatic life).
- Should water be diverted from the major northern rivers for export to U.S.?
- The adoption of existing proven water efficiency/water saving technologies and products (low-flow showerheads, front-load washers, water-saving toilets, drip irrigation, grey water re-use). By the general public and by industry and agriculture.
- Water conservation programs.
- We need data! Rejuvenate Alberta Environment's water research programs! They are a national disgrace. Basin management/protection and water conservation must be priorities!
- Wetland protection; water value to wildlife.
- Government needs to establish regulations (not guidelines) on water quality and needs to enforce them. Needs water management plans and water conservation strategy.
- Current needs will be unsustainable in some areas of the province let alone hopes for expansion.
- Public education and faith in our government.
- Stakeholders that develop in areas where elongated periods of drought can be expected as history has shown us should not expect tax payers and government bailout. If you don't do your homework don't be surprised. We should not play God with water, it is too important. Promote wise use and maintenance of our most valuable resource don't expect more. The water system of today functions well. Areas prone to drought will not be solved by throwing money at it, it is a natural occurrence.
- Not all water management or effective management requires dams, or water control structure.
- Develop ways to improve the productivity of Alberta's water. Ensure maximum productivity of Alberta's water and protect, through legislation if required, availability of Alberta's water for Albertans. We cannot allow the strength of the American dollar versus the Canadian dollar to wrestle control of Alberta's water from Albertans.
- Regarding flooding: Don't allow building on flood plains. You upset nature adversely when you build dams.
- Recreation uses.

- Dams in other provinces holding back water and causing damage to ecosystems. North to south borders of rivers; Peace, Slave, Athabasca, etc. Pollution damaging National Parks.
- Take care of Albertans, not others then 'no problem' in Alberta.
- Legal challenges from First Nation and Government. Harming the Peace Athabasca Delta, the largest fresh water delta in the world. A world issue not only Alberta's, in the future the war for water or survival.
- Very little respect for water is shown by the general public and industry in the province. This is demonstrated by the unnecessary large volumes of clean water that are wasted or degraded. Conservation of water in the province seems to get very little attention.
- Maintaining a healthy ecosystem and healthy aquatic environment. Meeting these challenges without harming the aquatic environment.
- Rather than collecting revenues, the government should be limiting the amount of development in northern Alberta.
- All of the above have to be addressed. Everyone is equally important.
- How do we develop a steady state, vibrant economy without continued growth and continued over-utilization of water and other natural, renewable resources?
- Sustainable environment = sustainable economy. Need to carefully plan so that the environment can be maintained.
- It is encouraging to know that the "ideas" group did not create these foolish challenges. These should be stated as the fact that most of them are; not disguised as a quiz on one's knowledge of current affairs and the future of Alberta's water problems.
- Protection of watersheds should be implemented now. Recreation and pulp mills should be reassessed as they are at present doing the most harm to our water supply and ecosystems.
- The big challenges that are missing are: Preservation of watersheds of major rivers systems. Immediate baseline studies of all Alberta rivers to establish and preserve in stream needs to ensure the sustainability of aquatic and riparian ecosystems.
- Drought in some parts of Alberta? Underground water supplies?
- A major challenge is not to isolate water challenges from its link to the other important components of a healthy and functional environment. For example, soil, vegetation (plant species), fish and wildlife, communities and landscape (both upland and wetlands) and air. The umbrella challenge will be to make integrated resource management and a decision making strategy that is in balance with the whole ecosystem.
- Manage on major river drainage basin basis (e.g. note behavior of Athabasca River is different from the Bow River). Mitigate changes to rivers caused by earlier dam construction (e.g. effect of Bennett Dam on the Peace). Take longer term view of viability of irrigation, particularly long-term droughts within the normal range of variability (e.g. Palliser Triangle).
- Total ban on watering lawns and parks, just to have green grass to look at. No export of water as long as we don't know what will happen to the environment. Learn to live with what you have in your climate.
- I believe politicians will need to look at what type of industrial and agricultural use must be restricted to prevent further contamination of ground and surface water (e.g. intensive hog operations, feedlots, oil and gas industry).
- Consumable water should not be used for steam injection for oil wells - but rather the oil companies should be looking at using the sludge waters from the mineral aquifers.
- The biggest challenge is to admit that our only option is to manage water in a sustainable way for environmental, ecological and bio-diversity health. If we do not do this in the "long-term" we will not be able to sustain an economy that is healthy. There comes a time when you say NO more growth, our environment cannot handle it.
- Priority should be placed on not contaminating any water or system in the province. Protect the water, the rest will take care of itself.
- Safe drinking water for people using wells. The cost of people testing their own wells is prohibitive - households should be allowed a "free" water testing per year.
- Information in this package discusses Alberta's commitment to water supply and quality to Saskatchewan and Montana; how about the dam that prevents adequate water flow to the Lake Athabasca delta. Water quality is also an issue as effluent from industrial processes may be causing

deformities in fish as seen in Lake Athabasca.

- Watershed/basin health and threshold use. How much is too much?
- Redistribution of allocations, quality, quantity, knowledge of what is available? Is it wise to move water from one basin to another?
- Education for all people young and old (i.e. school curriculum and media). Beaver dam control lessens dams, beaver population control.
- Do not promote factory farms owned by foreign groups and governments that will create problems for locals (i.e. Taiwan Sugar and Car gill).
- Inter-basin transfers of water and their associated biota. Transfer of water to the U.S.
- How small farms are going to protect their source of water from industrial or larger agricultural corporation use.
- Government and regulators should be more aware of the issues of water use.
- Groundwater and surface water availability. Education of the public as to the importance of our water resources, water conservation. Education of the public as to what measures the government has already in place to protect the quality and quantity of our water resources including groundwater.
- Government mismanagement. These questions have been written as if everything is fine now, however this is not so, Alberta Government has not managed, protected or even recorded the contamination that has already occurred.
- This is the greatest challenge. The Government needs ministers in Environment and Sustainable Resources who have knowledge of both thus concrete decisions can be made that will sustain our livelihood. Without H20 we cannot survive.
- Some other challenges to consider is the diversion of streams and rivers to bring water to other areas of the province is NOT a sustainable action and will negatively effect the area water is to be removed from. It will interrupt the natural balance of that area and cause problems with water quality, wildlife sustainability, and further impose limitation on farmers in the areas water will be diverted from. In Alberta, the amount of freshwater used by the oil industry is enormous and it IS possible to use saltwater rather than freshwater and alternatives should be considered. As this industry is the largest consumer of freshwater, more studies leading to legislation on water use limits should be in place to protect the sources of water for all Albertans. Areas that are currently cropped that require vast amounts of irrigated water, thus pressuring the already fragile supply, should be investigated as to whether these areas should be used for agriculture. Considering that we have serious drought conditions in Southern Alberta and precipitated water is sparse, it needs to be determined how long the water supply in this province can meet the demands of its farmers. If an area is naturally arid and has little precipitation, why are we struggling to crop these areas? Rather, we could take advantage of this areas high wind and produce Alberta's own wind power generating station. I am aware there are currently some in place although it could be expanded to other areas in the South.
- The fact that Alberta is more inclined to allow industry to do what it wants without consideration for the environment and common Albertans. This is a growing worry among a growing number of people.
- Downstream implications of flow regime changes related to climate or human use. We should choose aquatic ecosystems over economic growth, and use the precautionary principle based on ecological principles to identify whether growth should proceed.
- The cost of our water use will become higher in the future. This is definitely something we all take for granted until it is gone!!
- Additional challenges: Corporate pressure will increase to promote bulk transfer of water (bulk transfers must be prohibited). Corporate pressure will increase to promote privatization of water (privatization of water must be prohibited). Municipal water infrastructure will require costly maintenance or replacement. The gas and oil industry will desire more injection of potable water into gas/oil wells (this activity should be prohibited, and perhaps criminalized). The government will allow an increase in the number of intensive livestock operations despite the inherent hazard they pose to water.
- Long-term environmental impact of human demand for water.
- Sustainable environment is necessary for a sustainable economy. Albertans need to plan so both can be maintained.
- Overcome the fallacy that our environment can sustain perpetual growth.

- Common sense restriction and regulation of development that effects the environment and people who look at long-term effect not short-term gain.
- Effective management and use of our existing water supplies should be a priority. The continuing waste and mismanagement of our present water supplies puts undue stress on the quantity and quality of our water stocks. Before the government or any other body started to contemplate water diversions as a means of meeting future needs it would be better to rethink our present water usage. We need to look at countries in the mid-east, Israel or Lebanon, that are faced with severe water shortages, yet are coping and are able to provide for all their citizens. Conservation and management need to become our number one objective regarding water usage.
- Farmers and land users must be educated in regards to the value of sloughs and waterlands. Too many sloughs have been drained for short-term gain!
- Government will need to become proactive in monitoring and enforcing riparian area health on private lands and leased public lands–landowners are clearing right down to creeks and ponds, watering livestock there and polluting watersheds. Governments must take responsibility for the health of the watersheds.
- To create a seamless review that recognizes the different interests of those in northern and southern Alberta.
- Climate change does affect water to a degree, but if you study weather patterns, watersheds will be built up eventually.
- Availability of potable water with only 3% of the earth's water potable, none should be used for anything except the use of water that can be recycled or for human and animal consumption.
- Review current 10 year water licenses to industry. Monitor amount of water used by rural, urban, and industry and establish a data base for forecasting.
- Other provinces and countries will increasingly ask for or take Alberta's water for their own use.
- Phasing economic growth to ensure the long-term conservation of water resources and related ecological diversity within the province.
- Trans boundary issues.
- Protect the water from all abusers. They will learn if you enforce laws on them and the penalties cannot be a joke. A $1000 penalty is a joke to a company making millions as a clear profit.
- Must take trans boundary issues into consideration. Water flows in and out of Alberta.
- People and the natural resources of this province should come before some cow or industry. Look at what has happened in the world and then look into Alberta's crystal ball and see where we are headed. The future is poor.
- Education to society's effects on our drinking water. Not just agriculture and oil industry but also the mere fact of what urban people put down their sinks.
- Recreation pressures are already having an effect.
- Wildlife of all types.
- No more dams. No more inter-basin transfers. Water not to be subsidized and more conservation.
- Enforcement is an issue that needs to be addressed.
- Ways to encourage each and every Albertan to reduce water waste and manage wisely; too many act as if resources are endless. Encourage installation of lower water stream showerheads and other water saving devices; reduce lawn watering and car washes.
- Relocation of water intensive uses to areas of abundant supply (social aspects). Question c is misleading - will likely limit growth in specific locations - not on a provincial level. "j" infrastructure is more than dams.
- Developing technology to treat water for reuse and for utilizing previously overlooked sources.
- Watershed – not water management. Enforcement of water regulations. Pricing water as a commodity.
- Especially consumer education. How do our consumptive demands affect water use and pollution?
- Fish spawning, waterfowl and fish habitat, recreational use. Protect quality and quantity available to sustain healthy ecosystems for future generations. Pollution of watersheds, agricultural runoff, pesticides, fertilizers, manure management.
- Cumulative effects of all water users.

- The chemicals we are using to clean the water and their affect on the environment and on our bodies.
- Well drillers should be more closely monitored (i.e. protecting cross contamination of aquifers and the completion of water wells).
- Water discharge quality levels.
- Water should be subject to economic markets where it can be valued fully (i.e. price should reflect scarcity so that water is efficiently allocated).
- Liquidation of forest cover, mostly for marginal agricultural development, is becoming a significant risk to groundwater replenishment.
- To properly capture runoff water and eliminate use of harmful chemicals in agriculture and industry.
- Water diversion from north to south.
- To think of water management one has to look at the course of water. Soil erosion, poor land management, poor tree harvesting techniques and industrial demands beyond comprehension. A management system must not focus on what comes out of the tap but how it gets there in the first place.
- Water conservation should be emphasized. Albertans need to be educated regarding water management techniques.
- Look at detrimental effect of clear cut logging baring soil and causing erosion and contaminating rivers and streams.
- Industrial use of water on a short-term and small incident basis (i.e. oil and gas exploration - water withdrawal at random and unplanned water bodies). Water for use in wildfire – development of reservoir/caches on both Crown and private land. Water legislation having enforcement power, enforcement resources and a code of practices that are practical and can be utilized. Not like the present fuzzy, non-committal wording. A direct scientific link to water quality for the environment (i.e. sustaining and enhancing existing natural ecosystems). Much higher fines and penalties for contravention of water legislation in Alberta. Delegated authority of the Water Act to the people who are in the field and dealing with these issues.
- Change agricultural practices that limit the use of water and maintain groundwater levels. Plant wind rows, change crops to natural grasses, no-till, raise drought resistant animals, etc. Agriculture uses a large land base.
- Questions are very dependent on whatever area of the province we are in. There is very significant difference between south and north.
- What about the need to safeguard water from the users who ignore proper use and wastewater or indiscriminately pollute i.e. the users who know right from wrong but ignore the need for proper environmental health and standards.
- Dams that are located outside of Alberta's borders and the waters from them that flow through a river located within Alberta require the Alberta government to have better/some control of their flow. At present, communities and farms are in danger of flooding because the Alberta government has very little say on these outflows. I believe all governments and industry should work better together on ensuring that the dam be used as a control measure to ensure that no flooding will occur to communities and farms. This is especially true in the spring time, ice break up in particular. The dam should be used to withhold water flows, until the ice has cleared from the river at all communities.
- 74 billion worth of projects in Alberta within the next few years. Now would be a good time to take pictures and test to compare with the findings in seven years.
- Knowledge about water - commitment to climate change.
- What about the warming of the climate due to pollution? The Kyoto agreement is an important agreement to protect life on earth.
- Making sure that water is available for sustainable aquatic ecosystems and riparian areas. Make sure that agricultural and industrial concerns are not continually adding pollutants to water bodies and groundwater. Make sure that industrial users start using the salt water found below 400 feet instead of potable water.
- There will be huge pressure from U.S. to import our water.
- How much development can occur around major river systems without creating a major impact on the surrounding ecosystem? Very little. Water systems should be kept as natural as possible and reduce human impact wherever possible (e.g. don't build communities extremely close to major river system.

Alterations to prevent flooding-costly, environment and public).

- Industry must not be allowed to pump water into deep or shallow wells to recover other resources. Fresh water is going to be the first natural resource we run out of.
- Climate change, while it may not affect flows, may place significant additional demands for agriculture and in-stream requirements. Effective and efficient use and reuse.
- Qualifications of water system operators must be ensured by the Province. The Province should mandate that enhanced monitoring should be provided by water producers. Water monitoring information should be public.
- Who owns the water? Managing water also includes management of watersheds and riparian areas.
- We have to ensure that our aquatic resources are not pushed under the carpet in order to reap greater economic gains. We have to ensure that fish are given the highest consideration, and set minimum in-stream flow limits that can not be exceeded.
- Attracting economic activity in areas where resources exist.
- The Alberta Government must take a holistic approach to the water problems of the coming decades. They must start with garnering the scientific, technical information that is required to make sound scientific and non-political decisions. They must then consult with all stakeholders giving industry, urban, recreation, wildlife, and conservation groups equal voice - working together to keep this from being an either/or choice (economic development vs. conservation or preservation of ecological systems).
- Albertans will have to choose between the sustainability of aquatic ecosystems and agricultural expansion.
- If you accept a or i, all others are included.
- Monitoring and enforcement.
- I think these challenges are a very good start.
- Conservation and efficient use of water.
- Educating people to change their lifestyles so as to reduce their consumption of energy and material things.
- Protection of all watersheds (i.e.) no logging and industrial destruction. Preservation of wetlands through Provincial, Federal and Municipal legislation.
- The pressure from the U.S. to sell our water.
- Prohibit the export/sale of water for economic gain other than natural downstream flows.
- Effective water management does not necessarily mean you have to build ecosystem – destroying dreams to get the task done.
- Water resources should not be "sold" e.g. tolls; without first ensuring safe, long- term supplies for Albertans and other Canadians.
- Over use and abuse of aquatic ecosystems will have serious negative impacts on wildlife and recreational resources.
- The Government of Alberta must consider the fact that economic development and protecting aquatic environments can both coincide at the same time. It is crucial to protect our ecosystems for sustainment of water resources for economic development in the future.
- I do not agree with exporting our water to Montana or other states even from northern Alberta to southern.
- With increasing population, there will be an increasing demand for land and more urbanization which will result in an alarming increase in filling in 'natural dams' (e.g. wetlands, etc.).
- Legislation arbitrarily erodes or removes the rights of farmers to sub-surface water, while drainage management plans also places farmers in conflict with municipal and provincial authorities, which are by and large unresponsive, regimental, and unsympathetic to farmers and landowners rights and needs.
- Maintaining quality of Alberta's surface and groundwater for humans should be the priority, not for industry.
- Maintaining a "natural" ecosystem.
- Who should get the water during drought periods?
- Pollution of recreational lakes.
- The challenge of how to educate people of the need to use water more sustainably needs to be

considered.

- Do we have to have economic growth to the point where the quality of life in Alberta is diminished?
- Don't assume that unlimited growth is always good, lets try for sustainable growth.
- Do not link industrial with agricultural use.
- The biggest challenge is that Alberta's government is nothing but a business lobby group and as such, even in the face of the 'Declaration of Concerned Scientists', refuses to acknowledge that: 1. The environment (the biosphere) is ultimately important, beyond any other issue, including 'the economy', which, like all life itself, is dependent for its existence, on a healthy biosphere. 2. This planet is finite. Fundamentally this means there are limits to growth. This means that an economy which is built on the assumption of unlimited growth of consumption is headed for a collision with this limit. Either our assumptions (and actions deriving) will have to change or this collision will have disastrous consequences. Any 'consultations' and/or 'discussions' not guided by these realities are, at best, a waste of time. At worst, yet more cynical manipulation by a cynical government.
- This government needs to have a long-range plan, to think about the future, to think about people instead of businesses and corporations. It has been entirely too short-sighted, focusing on the cost of reducing pollution, the cost of lost business opportunities instead of focusing on what the next generations will have to live with. The cost of ignoring the future is much higher than the cost of listening to business, NAFTA, and corporations
- I am very concerned about consideration of water diversion and the lack of action on agricultural run-off and deep well drilling in the oil patch.
- Existing water sharing agreements between provinces and the U.S. will be challenged.
- Water quality especially for domestic use to maintain health and safety of all Albertans. Educate all Albertans to conserve water at all levels.
- Assessing groundwater - where and how much water is used for allocations (e.g. oil injections). How much? What is reclaimed and in what condition?
- Education - monitoring and enforcement of existing regulations. Balancing growth, social well-being and environmental protection. Pricing for water to reflect the social/environmental benefits lost by changes in quantity or quality.
- Optimize and upgrade existing water resource infrastructure and properly maintain to ensure continued operation.
- Lack of manpower in water management and safety inspections areas controlled by provincial government.
- Public, business, agriculture, recreational and others must have involvement in the decision-making process/structure. This issue cannot be left exclusively in the hands of politicians.
- Oil companies injection of fresh water for oil and gas recovery.
- Water conservation: same old story, if every consumer practiced more water conservation, demand could decrease very significantly.
- Maintenance of existing ecosystems. Dams and large irrigation systems are seldom if ever economical on a user pay basis. Read Marq D. Villeurs "Water." Stress conservation and protection of existing resources rather than development of new ones.
- The issue of pollution and destruction of ecosystems are not addressed to the degree that they need to be.
- Wetland loss.
- The past practices and effects must be understood before future plans can be made.
- Restoration of all sloughs and wetlands that have been drained for agriculture, industrial and urban developments in Alberta
- Immediate protection of all wetlands (regardless of permanency). Laws should be implemented and enforced to make drainage of wetlands illegal. Also need a detailed inventory of all wetlands, streams, etc., throughout all of Alberta (white and green zones).
- Convincing politicians and technocrats that growth in a particular geographic area should be based on current availability of water resources, rather than proceeding with departmental growth objectives and then deciding on how to re-direct water resources.
- Adverse effects of NAFTA which will lead to us shipping water to the US.

- More emphasis on requiring qualified operators in charge of water plants.
- Safe drinking water in rural Alberta will be an issue, especially with increased demand for economic development.
- Should be very aware of the fact that very different conditions exist in various areas of Alberta; (i.e. southeast water more scarce than in north west.
- The government needs to understand how its land use policies and current development strategies will affect future water quantity, quality and timing of flow. In the practice of sustainable development there are limits, all things cannot happen at once.
- No export of water.
- Lets consider a limit or zero growth. We cannot and should not be expecting to grow all the time. Why not just maintain what we have. The real Alberta Advantage is our open spaces, relatively clean air and water, and uncrowded landscape. Let's keep it that way. Do not encourage growth and an influx of people and the environment will be better off for it.
- The challenge will be to manage the water we have - as a whole population.
- Continue having "water workshops" or public meetings to address public concerns. Education/information sessions for locals.
- Swan Hills - possible contamination contribution. Limit some forms of economic growth and demand on water where it is scarce (e.g. SE Alberta). Is the growth sustainable?
- We need to look at tomorrow and beyond not only short-term plans - must be long-term.
- Effect upon water supply/sources by agriculture (chemicals, livestock manure). Limiting use of water. Wasteful water use practices.
- Select an Environment Minister that respects/protects the environment. Water source areas must be protected. Build an Environment Department that represents long-term interests of Albertans instead of politicians and global industries (petroleum, coal and forestry).
- We need a groundwater inventory.
- External pressures to access and use Alberta's water (i.e. export to US) obligations to other downstream provinces and territories - we need to remember we do not exist in isolation - water flows into and out of the province.
- Political pressures from special interest groups that support growth at any cost.
- Maintain healthy aquatic environments in all areas of the province especially in the foothills and mountainous areas of the province.
- The maintenance of good water quality and quantity is essential and must be considered as highest priority with regard to environmental management strategies. Water quality and/or quantity should not/must not be compromised for short-term economic/political/or any other self-serving interest. Healthy aquatic ecosystems are a pre-requisite to the well being of mankind. Future generations are dependant on wise use and responsible management of our aquatic resources and ecosystems. The concept that "effective water management will require significant investment in infrastructure" must be evaluated extremely cautiously, as such initiatives will, without doubt, compromise the integrity of our aquatic ecosystems and have serious impact on future generations.
- Guidelines need to be in place to address the issue of water systems on private land.
- Effective water management does not require investment in dams. It requires political will to deny irrigation water to a handful of farmers. Just buy them out. It will be cheaper in the long run.
- Increasing pressure from the U.S. to buy or demand our water.
- Stop disposal of fresh water from our rivers to recover crude oil. This water is lost forever!
- Security of water supply systems as a result of terrorist threat perceived or otherwise.
- Preserving the lakes that we have. Most of the recreation lakes around the City of Edmonton are deteriorating in quality and water levels. Not all the deterioration can be blamed on the current drought. Industries and farming have caused major damage to the watersheds around the lakes. Perhaps it is time to limit chemical application of fertilizers and weed killers, intensive livestock operations, and to make industries accountable for the water they remove from a water source.
- We need regulations (not guidelines) and enforcement regarding the care and treatment of water. We need to look at the larger picture regarding factory and farm contamination and pesticide use, etc.
- If we address a, b and g effectively the others will be looked after as a result.

- Equitable use of water between residential (urban and rural), commercial and industrial, should not only be on a want-need basis (e.g. watering lawns, oil/gas well drilling).
- A sustainable economy based on water conservation and protection from pollutants.
- The challenges of human population growth in Alberta will be a major problem. "Confined livestock operations are already threatening groundwater supplies, these will become a greater problem with the projected increase in hog operations." Drainage of surface water and mismanagement of watercourses has created significant problems in the lack of surface water for livestock and in re-charge of groundwater and decreased evaporation for local precipitation. "Healthy riparian areas can store more water than most dams to keep streams alive all year. Studies indicate that only 16-18% of riparian are in a healthy functional state." The use of potentially potable water for oil extraction should be seriously examined!
- Prevent the sale of water/diverting of water south of the 49th parallel.
- The overall issue of how water is used. Knowledge is the key to making these decisions. We cannot act in an economical manner without information on this resource. Accessibility, quality, quantity, external factors.
- Working with what the climate changes are doing rather than "against" or trying to change what is happening to the environment.
- Education of water users (agricultural, industrial, domestic) to improve wise use of water. Review of consumptive water uses including water injection for in-situ oil recovery.
- The major deciding point on any decision regarding water in the province should be the quality and quantity of water for future generations not only of humans but of species both plant and animal. Short-term economic growth should not overrule long-term sustainability.
- Monitoring and enforcement: totally lacking at this time. Need watershed management.
- I object to the example of dams in j, as if dams are the most important way to manage water. I think this is simply wrongheaded. I also think that the underlying assumption that continuing, never-ending economic growth is necessary is also misguided and in fact dangerous.
- The Provincial Government must get serious about enforcing pollution regulations. What about the vast quantities of water pumped deep into the earth by oil companies - it is not from the ecosystem and nobody seems to care. The government even fails to acknowledge this happens. See page 32 in the facts booklet.
- Sale and export of water to other sources outside the province. Use of groundwater for oil activities like at Cold Lake. Use of groundwater by other industries and/or them causing contamination to the water sources such as large feed lots and pig farm operations.
- Knowledge about Alberta's aquifer systems and knowledge about how and where these aquifers are recharged. Understanding that the tills in Alberta are not impermeable as many in the groundwater field believe. The amount of fracturing in those is tremendously significant, more so in many locations than sand. The concern is both from surface contaminates entering the aquifer and protection of those areas to permit aquifer recharge.
- Use of potable water to flood oil wells in the extraction of oil.
- Constitutional mechanisms (i.e. real laws) which allow for real protection/management of water resources (e.g. legislation capable of protecting ecological functions responsible for water cycling).
- Industry must educate workers with regard to contamination and pollution. Household members i.e. no waste, no pollution, no contamination. Farmers, nursery(ies) etc. onto and into the soil.
- Agriculture by irrigation should be discouraged. It is wasteful and harmful to the environment and basically is a subsidy of a few wealthy landowners by all citizens of the province.
- Water conservation measures should be mandatory. It is a shame that the City of Calgary does not meter water consumption by households.
- Water waste, I believe, impacts local and regional climate and this needs more study. Improving efficiency of water use is the most important.
- Dams are not all good. Not enough study done. We could live within our limits.
- We need to consider the long-term effects of our decisions and their effects on natural environments. We can't be looking solely at how water is needed by humans. We need to understand that our role is simply one in a long chain of water use. We need to realize that economic growth doesn't necessarily means

increased standards of living and an overall improvement in the quality of life.

- Alberta needs to be at the forefront in developing solar power and wind power.
- In certain areas of the province, the use of excessively large quantities of freshwater for oil recovery may/is likely to further exacerbate water shortages needed for normal healthy ecosystem functioning and for human use.
- Enforcement and regulations are the key. As ?? it they do not exist.
- Is the true cost of water reflected in the price of water - particularly for commercial use? For example, is irrigation water (southern Alberta) priced at its cost including the infrastructure to support the supply? Also do industries like oil and gas pay the true costs of the water they use, including the entire environmental cost of water contamination? Second issue not covered in the above is the issue around water conservation. Issues around controlling use (both commercial and residential), closed systems in industrial use, greater water capture (from snow fences near dugouts to residential rain barrels). These should be considered in the picture of water management. Finally, the whole area of commercialization of water (selling it) should be openly discussed. I personally feel that water should NEVER be commercialized - particularly in cross border trade. This is a slippery slope Alberta should NEVER get on to.
- Drainage of surface water still occurs, including in areas with water shortages. Alberta must have an effective wetland policy and strategy to limit further loss. Need wetland and groundwater inventories. Need to know what you have to work with.
- We need more studies on alternate uses of water. How to be more efficient. How to locate demand near the supply rather than insisting that we move the water. How to keep the water unpolluted.
- Educating Albertans about our water resources will be the biggest challenge. It is ignorance more than anything else that is the main threat to our water resources.
- Water as an apparent "free" or "inexpensive" resource particularly for large users. The diversion of redistribution of water resources within the province.
- If water has to be bought, what about those people who have no money, do they not deserve to live?
- An inventory of surface and groundwater supplies so sustainable withdrawals can be determined. Long-term monitoring to confirm sustainable yields are not exceeded.
- The real issue is the desire to pay for the real cost of proper treatment. As long as we are willing to invest in proper treatment and charge accordingly, safe water is not an issue. The assumption is that people do no want to pay for safe water. I disagree. Look at the relative cost of bottled water. Water conservation will also be achieved by charging a higher cost for safe water.
- Industrial use of groundwater must be controlled. Waste from intensive livestock operations - must have proper management for disposal.
- Honest information - interesting how most of the answers to these questions were provided in the background information provided. I particularly disliked the suggestion that we need dams to manage water - clearly an engineer's solution.
- There is significant interaction between many of the factors listed. Major issues are best stated as: 1. sustainable development of water dependant activities; 2. protection of environment; 3. conservation.
- There will be immense economic and political pressures to sell our water to the U.S., WHICH MUST BE RESISTED AT ALL COSTS!!! There are some things which should never have a dollar value attached to it, because they are priceless resources. Water is foremost among these, and there should never be any consideration given to selling it as a commodity. Inter-basin transfers should NEVER happen in this province.
- How to adapt or regulate the agriculture and livestock industry to minimize their impact on surface and groundwater quality.
- Manage land/forests to maximize water retention and minimize run-off/flooding. Very, very stringent pollution control to maintain water quality and protect human and environmental health. Protecting the ecological integrity of the aquatic ecosystem.
- Fighting off proponents of misguided water transfer schemes.
- Kyoto - should Canada/Alberta keep its commitment at the global level? Shouldn't the government be a bit more consistent?
- The current paucity of funding for water related research in Alberta.

- There is a need to consider the full range of ecosystem services provided by rivers, lakes and wetlands in Alberta. Traditionally we have viewed water more as a commodity such as fossil fuel making decisions about how to use it principally, sometimes entirely on the basis of whether or not the costs of storing diverting or using it are justified by the potential return on investment. The recent decision not to proceed with development of the Meridian Dam is economic, despite compelling environmental concerns.
- Another challenge may be to look at whether infrastructure (e.g. dams) is the most environmentally feasible way for effective water management.
- The sustainability of our water systems may lead to strong government leadership to limit or regulate economic activities in areas such as oil well flooding, contamination of groundwater by intensive feedlot operations and protection of watersheds by protecting wetlands and restricting seismic activities by oil companies. Growth is not always necessary when there is potential for scarce resources.
- The impact the increased demands for water will have on fisheries and aquatic habitat.
- Ensuring that we plan to live within the limitations imposed by water availability in each region – rather than transferring water from other river basins – which is not acceptable.
- The "need" for large water transfers from northern Alberta to the unsustainable south will become an increasingly volatile issue. I don't think that major inter-basin transfers should be made to help an unsustainable industry (agriculture) in an area that is not appropriate for this type of industry. Sure this may have some major economic and social consequences, but in order for Alberta to maintain any semblance of water quality and quantity, this will have to be done. These transfers should not be made for a variety of reasons: ecosystem alteration/destruction; increased soil sanitization in the south; and unequal importance placed on southern industries over northern industries.
- I suspect Alberta will face increasing pressure to transfer water South of the border, which should be strenuously resisted. Inter-basin transfers within Alberta also strike me as being important.
- River valley areas are critical for ecologist services (including quantity and quality of water) as well as bio diversity protection and recreations.
- The demand for inter-basin transfers from parts of Alberta, other provinces, and the U.S. will be very controversial, ecologically dangerous and possibly subject to WTO interference. Also, intense and increasing angling pressure in Alberta should be addressed to protect fish stocks.
- Changing the way our economy is structured to reflect the real costs of 'growth.' That is broadening it from relying only on oil, gas and forestry; look at the environmental consequences of dams, water diversion, continued industrial exploration, etc.
- The extent to which water shortages become a problem and limit "economic growth" is highly dependent on the direction we choose to take that growth. We cannot expect to expand industrial and agricultural activity in areas where water in naturally scarce and not cause major problems for ourselves and our ecosystems. Water management through damming and diversions is not a solution, as this just further disrupts the natural hydrological cycles and creates more problems. Conservation and preservation of aquatic ecosystems must be prioritized, in part because human health depends on the health of these systems. Another challenge that Albertans must confront is global warming, and our part in contributing to it. We must realize that all things are interconnected, and our oil and gas industry will be connected to our water problems in the future. This is only one of the many important and necessary reasons that Alberta should support the Kyoto Protocol.
- Increased demand for fresh water from outside Alberta will put pressure on our government to divert fresh water resources
- Albertans must be made aware of and be able to voice their opinion regarding any issues with water supply and quantity.
- The impact that industrial farming (i.e. industrial hog farms) has on the water supply.
- Average consumer wastage of water through non-necessary usage (i.e. watering lawns and golf courses, flushing toilets 20 times per day, household inefficiently washing vehicles and clothing, etc.).
- Prices on amount of water being used related to conservation. Limit of water per household.
- Society will have to change its way of thinking with respect to the free allocation of water. Individuals including industry must take more responsibility for conservation measures and for activities that lead to contamination.
- The use of water used underground to extract oil and gas is irresponsible.

- Teaching the public, private and corporate sectors how to conserve water.
- Knowledge about how to use water wisely and Alberta's water systems.
- Quit considering diverting water from the north to the south. Stop opposing the Kyoto Accord. Start creating strategies of making the Kyoto Accord work here in Alberta.
- Emphasis on use and conservation of water resources through education and metering etc.
- Increased developments will continue to threaten water based ecosystems in Alberta.
- The value of aquatic ecosystems cannot be overstated. Use of these systems for water; be it by damming, canalization, diversion, etc., essentially destroys aquatic ecosystems. In doing so, terrestrial ecosystem will be affected. A water usage strategy plan needs to be created so that existing aquatic systems (lakes, rivers, streams) are utilized so that impact upon them is minimized. Further industrial and agricultural growth that puts further pressure on aquatic systems and demands engineered solutions to water supply is nothing short of mortgaging the future to suit the needs of the present. Alberta's water strategy needs to be farsighted and address concerns of usage (how much, where and what).
- Inter-basin transfers should not be considered. Dams should not be considered. Water conservation should be a major consideration for increasing developments
- People must be informed and educated. Water conservation by industry and public should be top priority. There are several ways to use (i.e. tax incentives, pay per use). European countries such Finland and Sweden could be used as model systems.
- The role industry has is going to have to change. They will have to become leaders in water conservation. Should water metering be considered (daily use limits, increase price of water, not delivery charges, but the resource itself).
- We will likely have to change our practices to account for the reality of limited water supply. But other considerations will (and should) limit our growth at the same point (making it difficult to answer c and f).
- Teaching school children to use water wisely, turning off the tap when brushing teeth, etc. Promote conversion of lawns which consume water and require fertilizer to other landscape options, such as shale or gravel.
- A comprehensive watershed management plan.
- The inevitability of reducing crop farming in some arid zones in order to reduce irrigation demands, help protect grassland ecosystems and save other taxpayers the expense of water diversions.
- Challenge of meeting human water needs but looking after concerns of wildlife at the same time.
- Distribution of clean water and ensuring that water does not become a commercial commodity. Ambient resources cannot be sold.
- Biggest concern relates to Alberta's rivers and contamination from industry (especially pulp mills) and intensive livestock operations. Also, agricultural chemicals are out of control.
- We need to consider what is the carrying capacity of Alberta and thus what constitutes appropriate economic development.
- The government must be prepared to invest the money and expertise to assess the groundwater supply at present and at regular intervals in the future in order to adequately and honestly assess the impact of industrial/agricultural use, all use in fact.
- I believe what is most important is protecting and restoring riparian zones. This makes a major improvement in water quality, maintains suitable fish habitat and protects the resource. I want industries to be charged more for the water that they use for production as well.
- Need for cost recovery. Danger of IBT.
- I think that a related challenge may be influencing people of alternate means to economic growth - means that will not decrease or pollute the water supply in our province. I think that a new way of "thinking" needs to be encouraged.
- Concerns about gravel washing affecting aquifers. Population growth patterns, settle over areas where water is plentiful. Groundwater pollution is hard to clean up. Protection is important.
- Effective enforcement and regulation of water pollution to ensure healthy ecosystems.
- Regulation and enforcement of water legislation to conserve water and protect it from pollution (e.g. protecting and restoring wetland.
- Managing water to sustain life and keep it in the water cycle.

- Cumulative impacts lack of monitoring and regulations, and not truly integrating what "sustainable" ecosystems and economics means underpins these problems that are, not will be. We do not seem to know that a properly functioning environment underpins our economics.
- Inter-basin transfer of water will result in ecological damage in the donor and receptor basins. The export of Alberta's water beyond what is natural, places Alberta and Canada's water sovereignty at risk and has potential economic and ecological damage.
- Seeking of alternatives to heavy infrastructure and diversion of natural watercourses and water bodies must be seriously investigated.
- Growth need not be affected by water scarcity if we seriously address sustainability issues. Conservation and wise use of resources must become the guiding influences.
- Using water more efficiently for irrigation should be a top priority. Instead of blowing hundreds of millions to pipe northern water to the Environment Minister's riding, irrigation efficiencies such as drip irrigation should be used.
- Stop using water flooding in oil wells. Lake levels.
- Technologies to improve water use efficiency for agriculture, industry, and domestic purposes.
- Municipal and private sewage systems and intensive livestock operations contaminating our water supplies.
- Inter-provincial agreements for water must be maintained, as this is a shared resource. Sales of water to the U.S. should not be considered.
- How Albertans feel about water as a commodity. Adequate funding for long-term research on water issues.
- Protect ecosystems!!
- Enforcement for any type of pollution.
- Enforcement of people, companies or anyone or thing must be enforced right away. Clean up, large fines, and let public know all the information.
- The increased use of water in already arid areas, like around Medicine Hat and Lethbridge. Using water on these places, just to have it evaporate, seems like a waste, especially when agricultural output may not increase (due to increased soil saltiness or climate change).
- Do not make water a product to be sold to the highest bidder.
- Demand for our water from downstream and neighbouring jurisdictions (e.g. other provinces and U.S.).
- Alberta has a useful Water Act that is inadequately enforced. People need to be educated as to what the current water act entails, and the government needs to be accountable for monitoring and enforcing against existing threats to water quality before approving future developments that would likely not be properly regulated.
- Water use HABITS. Why allow irrigation during the day when 80% of the water evaporates. Policy to address water use.
- It is vitally important that the general public be educated about the threat to our water sources. Too many industries already exploit the easy access to water without trying other processes that don't waste water.
- Water for fighting fires.
- Terrestrial ecosystems may be affected by reduced water resources (ground and surface).
- The Province will need strong leadership willing to properly weigh environmental consequences against economic ones. There will be a need to say no to development proposals where water supply is limited rather than attempt to shift 'surplus" water from elsewhere in the province with infrastructure.
- Control or stop so called factory farms.
- Elimination of factory farms.
- Tight controls on factory farms. Strict controls and fines for pollution of land or water.
- Challenge is to educate people not to dump wastes and objects in rivers and not to produce waste or toxins on land, which with water runoff end up in the water sub-soil and rivers, and lakes, etc.
- Instead of looking at it as limiting growth, look at it as saving our ecosystem. Without it, there will be nothing from which to continue our economy.
- Ensure that the most advanced tools are utilized in ensuring that cumulative impacts are accounted for

and that industrial ecology is recognized as a MUST rather than an option.

- Current water rights. Is water "ownable"? Who has claim, who can buy, to whom do we well, if at all?
- Conservation of water will be difficult when the sale and export of water is permitted/promoted on an international scale. Elimination of non-tariff barriers to trade could make pollution of water hard to regulate in Canada.
- Education of people and industry on water management. Limit agricultural and industrial growth in areas that cannot be supported with water.
- Making major overhauls of irrigation canals that lose more water than they use. If more efficient systems were compulsory we wouldn't be worrying about shortages. Dams are not the saviours. Better carriage is more important.
- Technology will define new challenges that we are not aware of today. Therefore we have a moving target. The way these questions are worded, it promotes people who are not knowledgeable to agree!
- Industrial, agricultural, population water demands should not be allowed to exceed the local region. No water should be imported to an area where mother nature does not naturally supply enough moisture. Water extraction permits must cease to be issued to the oil and gas extraction industry, they have other alternatives.
- 1) people and performance - capacity building- many Albertans who rely on and manage water (as employees or as citizens) have little knowledge about what drives supply and water quality - since they have to make decisions, they must have better access to information and simple evaluation tools to help them make good decisions (i.e individual water supply and sewage disposal, but also surface contouring of land, vegetation removal, temporary access roads, some agriculture practices, land disposal of contaminants, use of herbicides in urban areas...2) scale - it is relatively easy to develop and implement management systems for large industrial operations that work for small operations or private activities, typically with little to bear on issues, systems are much more difficult to design and implement. 3) diversity and 3 functions - given the difference in scale of human activities, no single approach will work to deliver the three main functions of environmental management. The functions are a) influence human interaction with the environment: b) assurance that human health and the environment are protected as development continues, and: c) preparedness for hazards and new environmental issues (i.e., arsenic in groundwater). Most complex ecosystem issues - from an environmental perspective water is very difficult to protect, much more so than air, simply because of gravity, everything generally flows downhill and interacts on the way (air deposition, land disturbance, terrestrial biota are interdependent). Because of this, it makes sense that land management schemes are watershed-based. Air sheds and watersheds are linked only by climate and deposition issues, and basically do not need to be tied together from a management perspective. 5) Legal and jurisdictional barriers - hopefully you are aware of and did not choose to acknowledge at this time, the many legal (property rights just for a start) and jurisdictional and trade issues that challenge water management at policy, program and operational levels. 6) stable resourcing and ongoing mandate - in order to have an effective assurance program and a reliable water information system, the first thing that needs to be put in place is a resourcing system separate from government, basically a utility, paid for by industry and if necessary private users too and an organization to deliver the information management and compliance system, with a clear mandate - consider a DAO or Water Commissioner. The Treasury annual budgeting system has been proven to not work well enough for the delivery of programs that must continue - in comparison to public utilities and the recycling DAO's that have been created...you have to have a stable resource base and an ongoing commitment to a clear mandate - you cannot resource it the first year and then eliminate the funding as soon as another new initiative (the flavour of the year) comes along.... 7) cross-jurisdictional delivery issues - there are probably few areas with more overlap in jurisdiction, private landowner rights, industry associations, municipal development processes, several provincial ministries, DFO and other federal interests such as PFRA, interprovincial interests and international ones. Delivery of projects and programs and operations is very difficult - reducing overlap is a very large issue. Large benefits could be achieved by attacking the problem... consider a conference of Ministers and municipal authorities and industry.
- Federal, provincial and municipal government representatives should be more responsible when making decisions. Profit is not a good motivator for making decisions when it comes to the province's health. I refer not only to "people" but to plants, fish, animals and birds.
- Irrigation of recreational properties (lawns/parks) could be discontinued to cut municipal demand

drastically and ensure future supply. Legal system to ban water use for landscaping at municipal level would be necessary.

- Commodification of water.
- Monitoring enforcement bodies over the regulation of water use and taxes to those who do use water for industrial purposes, not basic human purposes (which is a right!).
- Effect of water shortage on the environment and other species and sustainability.
- Maintaining the integrity of wetlands, peatlands, bogs and pens, their interconnection and ability to filter water.
- Need to address impacts from point and non-point source pollution pharmaceuticals and infectious organisms from sewage and infectious organisms and nutrients from agricultural runoff.
- There will likely be an increasing demand from other jurisdictions to access Alberta's water supply. As well, other jurisdictions may increasingly demand that the quality and quantity of water flowing from Alberta exceeds current levels
- Public education is a very integral part of preserving the freshwater supplies in Alberta. Citizens need to be aware of how much water is being used for livestock and agriculture, as well as how unfettered domestic use is depleting the water reserves. Pollution of groundwater and surface waters from pesticide and fertilizer use should be made public. There needs to be a change in attitudes. Albertans need to realize that our water is not in unlimited supply.
- We must research and plan to met the challenge of water management now, to be prepared for future demands. Funding for monitoring and enforcement strategy to a comprehensive water management plan = ministry.
- Developing micro-neighbourhood recycling of water using phylo-remediation greenhouses.
- Trans boundary water issues - rights.
- Increasing limits to household water use (i.e. watering lawns).
- The alteration of shorelines of water bodies for recreational or commercial purposes should be severely regulated/limited. Drainage of wetlands/water bodies should be halted.
- e) Perhaps the growth should be where the water is. f) NB to sustain aquatic ecosystems. g) Must monitor who is not or who is following regulations.
- The need for a national and provincial policy in respect to the export of water resource to safeguard the interests and needs of all Canadians.
- The details of water usage for oil and gas removal activities (especially at the tar sands operations) need to be brought to the attention of Albertans. Also, the proportional use of water for irrigation needs to be emphasized and brought to the attention of the public. This can then be weighed against environmental priorities that the public may have.
- Protect Alberta's natural beauty while using water for farming and industry wisely.
- Water must not become a commodity in the Province of Alberta.
- Accuracy of environmental assessment needs to be re-evaluated.
- Finding the resources to solve potential problems or address the challenges identified in 2.
- 1. Water diversion is an absolutely ridiculous, scientifically unfounded idea. 2. The challenge of managing existing water in southern Alberta through conservation strategies for industry (e.g. , oil and gas), agriculture and all communities needs to be addressed in a more proactive manner. This recent drought highlights the need to address regional water shortages using scientifically defensible work, not political favouritism and buying of votes. 3. The preponderance of intensive livestock operations and their usage of fresh water and potential for contamination of potable water sources needs further statutory control.
- Regulation, inspection - not just money gain.
- Fixing the damage that contamination and increased draw has already done to our water bodies.
- When will the natives declare that the water is theirs and we have to manage it for them and their future use?
- Water should not be diverted from the northern area to service the southern irrigators. Deforestation should be looked at when looking at flooding as this bears on the chance of flooding.
- Irrigation is a costly way to subsidize agriculture - the cons are many.

- Alternative technologies to fresh water use in industry need to be examined and explored, (e.g. use produced water for water injection (oil/gas recovery) instead of fresh water. Water rights (licenses) should not be sold from one user to another. There is a need for more enforcement people to administer the Water Act.
- Protect wetlands no more dams, cost-effective irrigation, limit use of water for golf courses, water floods, water well drilling and reclamation - pollution of soil and water.
- The sale of our water should not ever happen. We need to keep and protect what we have.
- Industry using water when there are alternatives even if a little costlier. Non-renewable use a problem NO NO! Commercialization of water licenses NO NO! Strategy fits between water and S Sask basin affects all government.
- The practice of injecting potable water into oil wells must be stopped.
- The use of water for oil injection wells, other sources should be used.
- Quantity and quality of water used in Alberta households.
- Damming is "diversion" no management - taking from one area and giving to another.
- The challenge of actually coming to terms with limits to economic growth and population growth and their combined impact on our water resources. The government must have resolve to cease allocation of surface waters at a point that will ensure maintenance of healthy aquatic ecosystems. The government must give up on the ecologically dangerous idea of inter-basin transfer. It would be a short-term solution that would have costs that we cannot even begin to fully understand.
- The government needs to review and put in place comprehensive guidelines regarding industrial use and contamination of fresh water. They need to research how the 'waste' water can be treated and reused safely for human consumption. There needs to be more intensive management of livestock interaction with our water courses. Both Crown land on grazing dispositions and private land needs to have comprehensive legislation to protect the watercourses from farm discharge and livestock contamination.
- Users pay for clean-up of rivers e.g. storm and wastewater.
- By water conservation I mean wise use and reducing consumption, not the government's Orwellian definition.
- Enforcement on water bandits or water pirates, who will try to take a larger share of the resource.
- Oil well drilling use of large amounts of fresh water - other technology available.
- The above challenges use the word "will" when many of these are already established facts.
- Albertans will need to come to the realization that succeeding generations cannot continue to have everything bigger, better and sooner than previous generations.
- Municipal water systems are not using the filtration systems to their maximum efficiency, to save money. They use more chlorine instead because it's cheaper.
- Farmers need to be better informed about the procedures for drilling seismic shot holes and temporary water wells so as to indicate to the companies involved the options best suited for the farmer's property.
- Water flood by oil companies with fresh water should be discouraged. They should use alternate methods.

Red Deer and south

- Wetlands need to be maintained. Developments in these areas are devastating to the ecosystem.
- Severely limit massive hog farms and beef operations. No more in southern areas – 12 million – is absurd. No more dams.
- Take a look at "your" soils map and ask yourself why are farmers still breaking land in south east Alberta? This area has always been a challenge to work - do not ship water south to the dust bowl.
- Outflow of lakes should be kept clear and not plugged (as Sylvan Lake).
- Recreational use of water bodies. Sustaining wildlife habitat (all kinds). Fisheries.
- Recreational. Wildlife, fish habitat. Economic quantity - sale to U.S. etc.
- Ensure that oil production does not contaminate water sources.
- Keeping nesting places, good recreational areas and a close control of the industrial use of our water. Our water must NOT be sold. It is not a guaranteed sustainable resource.
- Weather influences water excesses and shortages.

- How to live within the limits of the ecology and apply appropriate technology and innovation. Without environmental integrity, we have no basis for healthy communities, strong economics or even civil society.
- Establishing priorities for long-term water use and saying no to users. Long-term thinking – immediate needs or wants must be kept in perspective. National strategy.
- Water will not only become an increasingly scarce resource in Alberta, but in Western Canada.
- The sale and shipment of water out of our province should never be considered. The use of water to pressurize oil fields should be stopped.
- Do not build anymore dams for water reservoirs.
- Water based recreation opportunities are limited now and will become a major issue in the future in terms of tourism as our water resources continue to be at risk.
- Immediately stop using fresh water for secondary oil recovery.
- Protection of mountain and foothills watersheds to ensure water holding muskegs and forests are intact.
- Is it wise to move water from an ecosystem where is it plentiful to an over stressed water basin. What of the future of the system that is being drained? What of habitat/people "downstream?"
- Forestry practices and industrial growth all affect water quality and flow. Stringent standards are needed province-wide that are monitored and enforceable (i.e., Alberta Environment needs the proper funding and support to get this responsibility back into the government ranks where it belongs). All these wonderful reports and strategies have little impact once they have been shelved and forgotten. Huge money is often spent on these initiatives, and very little done about sensible recommendations.
- The degradation of the west country has had a profound effect on water quality and flow - it affects the areas downstream and significantly contributes to loss of water life.
- Can the 50% allocation to Saskatchewan be decreased?
- Urban growth will have an impact. Reclamation of water after use to a standard = to preuse. As a headwater source Alberta has a national responsibility to ensure flows and quality.
- Eliminate expansion of water use when return flows are minimal (i.e. irrigating, cooling towers, etc.) in areas of water shortages (i.e. southern Alberta).
- Keep water an affordable, accessible resource by ensuring appropriate use by all users. Review licensing approach, I don't agree that senior license holders should have limitless access to water. Establish appropriate stats for use. Reward good behaviour and punish bad behaviour.
- The non-renewable use of water resulting from deep well injection by the oil industry.
- Alberta appears to have a good supply of water. I don't support diverting water at all costs to areas where water is limited. It is more effective to create development where there is water even if people need to move. This is about sustainability.
- Priority of water use should be considered to promote wise and efficient use of water (i.e. drinking water versus oil field injection - currently equally assigned is no differentiation between which is more important.
- Prevent 'sale' of the resource for short-term gain but long-term pain.
- Water license should be issued for given time only otherwise they become a profitable part of sale item on sales of property.
- A radical shift in attitude is required for a sustaining and sustainable water ecosystem. That is, the economy is dependent on the earth. Preservation and protection of water ecosystems gets short shift in this list.
- The most significant challenges are overuse and misuse such as waste and pollution.
- Choices whether to allow industrial/agricultural growth in low water supply areas. Technological development to treat low quality water for consumption.
- Consider solar power as an alternative to gas/oil production, therefore less pollution, more water availability for domestic use that is safe water.
- Enforcement of existing legislation, use the tools we already have in a more effective way.
- Development strategies need to be sustainable in that they have to fit in with available resources. Land use planning needs to fit in with available resources.
- A national water strategy must be developed as our watershed includes NWT and Sask. The strategy

must be developed in concert with the provinces, territories and water use stakeholders.

- Commodity for sale? No.
- The challenge is to retrain governments away from their "bigger and better" mind set (i.e. if the people in the south don't have enough water to raise 5 million cows, 20 million hogs and still grow enough to feed them). These people need to get together and prioritize. Let someone in the north raise the cows and concentrate on what their land is best suited for. Do more with less water! Government should not be building more dams that will not fill with water. Rather the government could provide low interest loans to farmers/co-ops, etc., to buy low-impact technology with savings devices, etc. Cut pollution NOW – much cheaper than cleaning up later. We know what pollutes water, so quit doing it. I would add a reliable economic base – as opposed to over dependence on oil and gas and petro chemical – "boom and bust" is out. Lean, mean, green are in.
- The maintenance and protection of aquatic and riparian ecosystems.
- Maintaining the present recreational benefits provided by Alberta rivers, fishing, and boating, scenic resources, riparian habitat for wildlife.
- Should water be an economic commodity? No!
- Conservation, education and construction method changes should be promoted.
- Protection of riparian areas. Protection of forests that control water runoff. Protection of stream beds and life in the water.
- The considerable pollution and contamination of rural wells by large factories farms that will be an eventuality if we do not contain the explosion of growth. We also need to have much higher standards for these factory farms. There is technology out there to limit the environmental impact of these factories. Recycling of the manure and composting of the manure limits the spreading of manure. This is currently being done by a hog producer here in Alberta. It seems the Alberta Government is unwilling to admit the environmental affect these pig factories will have on our water quality and quantity. Until the government addresses this issue, we might as well forget about planning for the future because our water will already have been compromised. Every country and province that has experience with the explosive growth of these pig factories can attest to the damage they do. It is very arrogant and negligent to think that we will not have the same problems they have encountered and are currently trying to cope with.
- Shallow groundwater recharges from wetlands - the challenge of restoring the surface water component of the hydro logic cycle.
- The politics of water allocation will be very divisive. The ability to assign water uses equitably, not necessarily on a first come first served basis will be crucial.
- With a government with the attention span of a gnat, what is the point of developing a long-term water strategy.
- The vast amount of manure that comes from intense livestock operations poses a serious threat to water quality.
- First in line policy will need to be addressed with new legislation which prioritizes use rather than first in time.
- Must safeguard our water - don't allow export for profit. U.S. demand for water will increase.
- There is a serious challenge and threat from our neighbours to the south. That being the U.S. They will do everything in their power to attempt to obtain the water resources of this country. They will even resort to economic extortion. If this province is even considering allowing the U.S. access to our water resources, I would think all Albertans and Canadians would scoff at this idea. This does not teach those who require these resources to manage their own resources effectively. The Alberta government has taken a draconian approach to everything else except water resources. The government has taxed the heck out of i's citizens and most barely squeeze by these days. We do not want to hear any more of the "Alberta Advantage" from our government. This is propaganda which holds no water. Pardon the pun. It is about time a significant tax was placed on water. You cannot teach citizens to use water wisely because they do not think about the overall picture. Without water, we will have no life and no economy, the economy is not really that important anyway. How many people can this planet sustain? My guess is, no more than we have now. PLEASE. Use what resources you have to inform people of the wise use of water and under no circumstances allow the U.S. access to this province's water. This is not a 'selfish" thing, but a direction to take care of their own resources in a much better manner.
- Convincing development to move where the water is instead of taxing watersheds beyond their capacity.

Getting the political "will" to stop development in over-allocated watersheds.

- Protection of the aquatic environment is not clearly identified in the above points.
- Do not promote more industrial growth in southern/central Alberta. Save aquatic ecosystems.
- Do you really think "borrowing from Peter to pay Paul" policies are the answer? Or is the government looking for a cash cow comparable to the oil and gas industry.
- The continued use of fresh water injection for secondary oil recovery has got to stop. This water is lost forever. The irony - obtaining a non-renewable resource by using a resource that cannot ever be recovered or reused. A double hit I'd say.
- Considering recharge needs for groundwater storage. Protecting our resources from U.S. and their inefficient use patterns.
- Conservation of existing water resources, efficient use of same.
- Loss of riparian zones along streams, uniformity across province, meters for all users. Cattle watering away from streams, dugouts. Regulations about drainage into waterways (i.e. feedlots).
- Funding of infrastructure will be expensive therefore funding ways such as private/public partnerships should be investigated.
- We should probably be looking at how safe the treated water from sources such as industry, farms, cities really is. Are we sending water back into our streams and rivers which isn't treated safely?
- Properly trained personnel to avoid a situation like Walkerton.
- The priority should be water conservation, protect watershed (i.e. supply). We cannot increase the amount of water available so we must protect and conserve what is available from the natural supply.
- Regional water systems are major factors for potable water management. System of water systems are operated on utility rate basis.
- Putting a dollar figure on water with the "water transfer program" will be the most challenging to control and maintain fairness.
- Enforce and implement the existing regulations. We don't need large dams or inter-basin transfer.
- This book makes no mention of the loss of water through injection of potable water [by the] oil industry - should never happen.
- Promotion of conservation, limiting of sale licenses.
- How to balance the 80/20 rule in the agricultural sector which sees 80% of surface water go to support 20% of this economic driver. Perhaps moving agriculture closer to source (in the north) and reduce irrigation demands would lessen impacts. To better understand groundwater supplies and demand.
- Restoration of drained water systems are necessary and will be costly.
- Use of existing surface and groundwater.
- With urban growth expanding at a fast pace, how will we deal with supplying enough quality and quantity of water to grow our food and still supply all these new homes - particularly country residential.
- Important to mention the choice of both, not one or the other. Trouble with the questions as they refer to the future not the present. Resulting in the answers to be of the same perception but demonstrate different answers.
- Ways to implement conservation by all users.
- These are not "future challenges"- they are realities!
- Government interest in resource extraction, logging, etc., will have a significant impact on the land's ability to ??
- Look at bringing northern water to the south.
- Restrictions on water transfer (diversion) will induce growth into areas where water is plentiful and slow growth in regions where development cannot be supported by/due to inadequate water.
- Tax incentives/credits for developing more efficient water usage need to be generously offered to Albertans (e.g. water efficient toilets, agricultural drip tubing underground as opposed to wasteful surface irrigation watering/sprinklers, improved industrial water usage technology/techniques). Will also induce intelligent usage and technology development to ensure efficient water usage.
- Enhance and expand Alberta Environment's capabilities.
- Preserving the wildlife and fish populations should be more important than extensive economic growth.
- It is essential that the personnel who consider the criteria for managing Alberta's water understand that

all the above-mentioned work in concert with one another and that the consequences of one action will affect the others.

- Educating the public to conserve water.
- Changing wasteful water behaviour by Albertans to reduce consumption.
- Ensure we don't sell off our water to the US. To third world countries who are dying because of the lack of water would be acceptable.
- Limiting growth in Alberta, we have overdeveloped and grown very fast in a short period of time. It is time to slow that growth and development down so that it becomes manageable. It is hard to do this in such a prosperous province, but the consequences are greater than the risk of losing business.
- Keeping trout streams intact.
- Convincing the general public that water is not free.
- Research and development of water conservation methods - funding a limiting factor. Political will to enforce current regulations. Long-term funding of monitoring, education and enforcement programs. Get serious about it! Wetland policy.
- The challenge of farmers wanting to drain river systems should be considered a direct negative impact on Alberta's natural environment.
- What about municipal growth and the effective treatment of wastewater? Higher demand on waste treatment facilities. How is that being considered?
- Difficult to prioritize - a number of these [challenges] will demand attention - therefore tried to address issues which will not be automatic.
- Alberta should work more closely with other provinces and the federal government to harmonize regulation and conservation strategies with regard to water.
- Regulatory system to limit or stop the disposal of industrial (non oilfield) wastewater via deep well injection.
- Determine the safe limits for the use of our resources in each region and don't allow those limits to be exceeded. Our goal should be to maintain a very healthy sustainable environment that can support a high standard of living for a society up to a certain size. Beyond that safe number, risks increase and standard of living decreases for every member of society as population numbers and resource use increases.
- Need further understanding of impact of water diversion program on wildlife ecosystem. They may result in short-term benefit at the expense of long-term cost.
- Affects of forecasted reduced flow rates on aquatic habitat species diversity. Who gets the right to water first? What criteria will be used if this is to ultimately occur? Can it be avoided? How can we Albertans better use effectively? Social issue.
- Challenge to get agricultural users to recognize that they have been getting a free ride in the past and are now competing with other users.
- Government should take a lead role in water basin management - and not just observe water basin management processes. Conservation of water should be a main plank of any water strategy - (j) should have been worded - "Effective water management will require increased conservation of water resources."
- Water is as essential to all life as air and should be protected from any private industry involvement. Economy should adapt to the water supply, there should be an effort to develop economic strategies that place the environment first.
- Keeping the government regulatory regime reasonable and realistic in dealing with issues. Too much bureaucracy already. Federal and provincial regulators need to be on the same page to address issues.
- Will have to limit growth of Edmonton, Calgary and other large cities.
- Education with respect to conservation and understanding of water as a resource.
- Understanding and viewing the value of water as an element of the natural system rather than as a commodity.
- Sustainable growth should include understanding of sustainable water use.
- Keeping the government regulatory regime reasonable and realistic in dealing with issues. Too much bureaucracy already. Federal and provincial regulators need to be on the same page to address issues.

- Water treatment processes for rural homes and small communities - using chemicals creates wastewater.
- Yes, information (correct information) of cost efficient methods for safer drinking water.
- General education of the public is lacking, with a lot of misconceptions and inaccurate information.
- Most water in southern Alberta is used for irrigation of low value crops. The sugar beet industry for example needs a subsidy to deliver the water and then the sugar needs a subsidy to compete against cane sugar. The sugar industry in Taber should be closed immediately. This would free up water for other uses. Wheat is irrigated even though our "conventional" wheat farmers are having trouble selling all of their crop at a profit. The farmers in the irrigation districts should be forced to pay a fair price for the water delivered to them. This would put a number of them out of business and would ease the water supply problem.
- Other ministries Alberta Environment, Agriculture, Alberta Health, Transportation that also need to be involved in overall policy and government direction. What about other industries/uses for water.
- Development with financial backing versus independent adjacent landowners property/water protection.
- Denuding of the eastern slopes, mainly by unwise clear cutting, and even injudicious logging, will greatly impact the ability to retain snow cover and thereby afford sustained release of water during the summer.
- Need to wean the public and industry from idea of dams and transfers as the solution. Need to regulate agriculture as rigorously as all other industries.
- I have reservations about dams. I would prefer Alberta concentrate on attracting NON water intensive businesses and stimulate economic growth in the knowledge industry.
- Public Education re wetlands/water issues and conservation.
- Governments failing to honour commitments. Let the Basin Advisory Committees do this work.
- Yes, short-term politically motivated decisions (i.e. interference).
- Acknowledgment of the critical importance of water (i.e. as opposed to economic development). Water is more important than oil and gas, forest products or agricultural products.
- Conserving and enhancing wildlife habitat.
- Education, rather than scare tactics must be employed in this process.
- Addressing water management MUST not be limited to allocation and infrastructure issues – but must include substantial attention to control of efficiency in use. This is completely dependent on the nature of this growth. It certainly may limit agricultural growth, but sustainable, water-sensitive growth maybe be valid. Is provision for irrigation in many areas reasonable use under present circumstances? Some issues like this need consideration. No mention is made of the potential of trade in water as a commodity (as is under discussion at Federal level), as this would have tremendous impact on all these issues. Some provision needs to be stated that conservation/management policies are not targeted ONLY toward human use – provision for healthy ecosystems is essential.
- Questions appear to be leading ...
- Water use restrictions (meters). More regulations for making companies/corporations responsible for groundwater/surface water cleanup, as well as tougher levels of cleanup.
- Creating arable land from non-arable districts and in turn putting strain on water resources and infrastructure.
- Do not give our freshwater away.
- Yes, efficient use of water: water meters - home and agriculture, irrigation water waste, beef requires more water to produce than other foods, therefore we need it.
- Water strategies need to be all encompassing. For example, there is a limit with regard to the quantity of water I may draw from the river, but no such limitation on the water I draw from a city water system. What is the difference to the environment?
- Flooding is not a threat to humans if certain activities are not allowed in flood plain – no residences or industrial activity but agriculture (crops) allowed.
- The importance of preserving shorelines to both maintain bio-diversity and protect the aquatic environment.
- There is a whole constituency effected by the gross change in water supply management/pricing issues (i.e. seniors and [those with] low income have little ability to respond directly to programs).
- The possible effects of urban runoff.

- The disparity that the north possesses a majority of water whereas the south is the area of prime economic growth.
- What should a rural user of water do to ensure they are not contributing to this problem - domestic well, standard/maintenance. Individual effects - must recognize importance of water and what impacts I have on water.
- Pressure to sell water to distant users (in and outside Canada). Effective water management can include monitoring and conservation techniques at all points of the flow (industrial usage/waste, individual homes). Alternate sources of energy (i.e. non-water fueled) could ease the strain on water supplies.
- Access to rivers should not be controlled by individuals.
- How about attempting to insure that agricultural and industrial growth is controlled by the availability and location of existing water.
- Water conservation.
- Government must ensure growth with protection. That is the challenge at hand. (i) More government money to understand science of water systems for better management decisions.
- An increasing need to protect the source of Alberta's water (e.g. the watersheds, including the land and the rivers in the foothills). Increased emphasis on preventing water pollution rather than treating it.
- Inter-basin transportation. International transportation.
- Current water withdrawal licenses and how this process will be reviewed/revised.
- The "commodization" of water and how that will be dealt with in Alberta.
- Need to have an overall plan to manage pollution and sustainability of the aquatic ecosystems. Cannot look at water alone but need to look at all factors that affect water (i.e. logging in watersheds, controlling size of feedlots).
- Citizens who are unwilling to use water efficiently.
- To honestly address the issues/concerns mentioned above, will require a very dramatic and uncomfortable change in the approach to economic growth the province has currently been taking. Water is a commodity we do not have full control over and as such we need to understand our reliance upon it much more clearly. If the time has not already come then it is not far off when our activities are determined by the amount of water available to us and our grandchildren. We must ensure that a good, clean supply remains in place for ourselves and future generations. To consider doing such, by necessity, forces us to completely re-evaluate our priorities as individuals and a society.
- Bedroom communities lack infrastructure to prevent contamination (sewage etc.). Demand for water from other provinces/countries. Elimination of wetlands. Impact of population growth.
- This society takes a clean, plentiful water supply for granted. Re-education will be an uphill battle.
- Restoring, maintaining and enhancing aquatic ecosystems. The Fisheries Act.
- Water consumption, wastage and use should be regulated by the provincial government.
- Non-consumptive and low-consumption uses for water will always eventually prove to be the highest and best use of our water resources, and should be seriously considered. Nevada is way ahead of us in that regard. The financial return on water used for flushing toilets in Las Vegas far outweighs agricultural returns from the same amount of water. That State is busy buying back agricultural allotments, and putting that water to a much more lucrative use. Our decision makers seem totally oblivious to the fact that there are better uses for water than agriculture.
- How to maintain ecosystems (riparian) in the b face of increased agricultural/industrial use.
- Conservation strategies. Balance. Water presently undervalued - supply/demand. Population growth.
- Widespread consistent water quality monitoring is required. Increased security measures for drinking water source protection (i.e. anti-terrorism). Effective water management will require cooperative planning at the watershed level.
- Better management for Alberta's aquatic species (i.e. Bull Trout).
- Balancing public perception with scientific knowledge - basing decisions on fact versus opinion. Lack of appreciation of the benefits of economic development, of the benefits of the resource sector to Albertans, and how the water issue can, potentially, affect those benefits.
- Need for new technologies to cope with sewage and wastewater.
- Use effluent water for agricultural use not power plants.

- Water, like oil, gas and timber is a valuable commodity and must be treated like one in harvesting, pricing and delivery.
- Protecting some aquatic systems in pristine conditions. Look at buying back old licenses in basins that are over allocated.
- Albertans will have to choose between the sustainability of aquatic ecosystems and a current way of living based on excessive consumption and waste production.
- "Commodization" of water, the fairness of, and political/economic impacts of, the apportionment agreements.
- Education. There is enough water available, provided it is used responsibly. Education about effective water use in the home, outdoors, and agriculturally-including where consumers buy their food and the repercussions of that.
- Dealing with traditional notions of entitlement to water use.
- Excessive use in some circumstances and groundwater contamination, pollution - especially in the Rocky Mountain areas.
- We should be looking at the amount of water that irrigation uses and how much of Alberta's total water consumption is used for irrigation. Seeing that in California large amounts of irrigation have ruined once fertile farmland, perhaps we should look at the long-term effects of irrigation.
- Land use of private property in watersheds may have to be more closely regulated.
- Serious public education and outreach regarding water conservation, and wide use is absolutely a priority. There needs to be more research (and use of knowledge) regarding the numerable ways that industry (particularly oil sands, agriculture/ranching, slaughterhouses, etc.) can use water more sustainability. Too much waste!
- The challenge to live within our means with water and prioritize use. Leave enough water flowing east to Saskatchewan.
- What are the climatological impacts of moving water to areas where it is needed?
- Urban growth will increase pressure on water supply.
- Education of the public is a key.
- Forming dams and diverting rivers have severe effects on the ecosystems and people downstream who have relied on the river the way it was in the past. Every decision to alter the environment should be made after ALL of the consequences have been considered. The short sightedness of some of the decisions made and others that will be made are analogous to the slashing and burning of the rain forest for a quick buck.
- Research closed loop, recycling of water for industry - phase in mandatory recycling, use wetland water recycling.
- Alberta needs a water act/law for water contamination/pollution in our province.
- Formation of watershed boards, raising public awareness within those jurisdictions and facilitating watershed representatives to make choices and have the tools to make those choices is a must and at the same time a significant challenge.
- Protection for the headwaters of Alberta's river systems flowing from the eastern slopes. Prohibit further disturbance of stream beds by roads and industrial activity. Prohibit clear-cut logging in sensitive areas to allow forests to absorb and retain precipitation.
- Water is intimately connected to other natural features such as forests and soils. It is difficult but essential that management of forests and soils (agriculture) should be integrated with water management.
- Ethical policy and conditions with regard to the sale of water to the U.S. should that come to pass.
- I hope the government is not stupid enough to destroy aquatic ecosystems. Sustainable growth many mean limited or no economic growth. We may be topped out already.
- I see challenges where there seems to be no data that has been accumulated or reviewed on what risks there are already being placed on our water systems. The Columbia Icefields are slowly disappearing and what impact this will have on the water systems. The damage to water systems if the government decides to let the oil and gas industry have roads and drill for sour gas in the Bighorn. Have any studies been done in this pristine area for what impact drilling will have on the watersheds? I also see challenges that are going to impact the Bow River and question the government on what damages this also does to the water systems in Alberta.

- Demands in future from U.S., Free Trade, etc.
- Cleaning up the rivers and lakes that are depended upon as a water supply for Albertans. There is still a lot of pollution going into our watersheds.
- Water is not available for export.
- We need to rejuvenate the fish stocks in our waterways.
- We must not allow short-term economic growth to impact long-term environmental stability. Sustainable growth does not include stretching water use beyond capacity.
- Effective water management may require greater regulatory controls and/or incentives to modify usage behaviour e.g. compulsory metering, cost incentives, recycling of water.
- Should we be using water for irrigation in the way we now do? Is there a better way (more efficient)? I include agriculture, urban lawn watering in the above.
- Why this water strategy let current planning in basin advisory committees continue.
- Promotion of water conservation should be emphasized.
- In light of problems related to climate change, alteration of watershed flow patterns should never be considered.
- Pressure from U.S. to sell them water.
- Some of Alberta's aquatic ecosystems have already been "developed" too far. These ecosystems are extremely sensitive to other development like logging, mining, feedlots, etc.
- Industrial users must develop conservation goals before being granted water permit renewals.
- The placing of industrial complexes in southern Alberta if they consume water at present. The method of water-flooding oil fields (old) for recoverable oil. The water is lost period.
- Public awareness is the priority for the Alberta Government. Implementing limitations by way of bylaw and municipal enforcement. Water waste control.
- I think that current water use needs to be evaluated, for example - the use of groundwater in oil recovery projects effectively contaminates that groundwater - this is a big concern.
- Pressure to export water. This should not be considered an option. Intensive agricultural production is a serious threat to water quality and supply.
- Population growth may fall under item c above. Change to human behaviour and attitude.
- Population growth: real estate developers and municipalities need to take more responsibility in limiting growth in areas that cannot support more water users.
- Impact of the Free Trade Agreement on bulk water exports to the U.S.
- Aquatic ecosystem maintenance and reclamation, habitat, flora and fauna.
- Efficiency in water use.
- There needs to be a clearly defined, easy to comprehend set of procedures in place. This will help Albertans understand their role in a water strategy.
- Conservation as part of knowledge.
- Management and education will be insufficient to ensure a supply of safe water for Alberta's needs. Laws need to be enforced.
- We have to recognize that every environment has a finite carrying capacity. If that carrying capacity is exceeded, then the quality of life suffers. I hope that the government will recognize this and not continue to promote growth and development which will ultimately harm our environment and reduce the quality of life.
- Carrying capacity of the lands to support development. Non point source pollution (quality). Wetland preservation for water purification (not use for storm water disposal).
- What is Alberta's responsibility to communities downstream, since we have many water sources and they may be so fortunate.
- We must be careful in our need to engineer and manage water that we do not adversely impact the ecological systems dependent on the natural water system in place today.
- Water rights - both municipal and individual - and how it would effect the general good.
- The existing water rights licences will need to be cancelled and re-issued, and the new licences will need to reflect the scarcity and importance of the water right. Grandfathering the licences is not in the best interests of all Albertans.

- Reuse of wastewater, use of rain water.
- Volume of water is not as critical as the quality of the water.
- Given our commitments south of the border (Montana), will there be greater pressure on us to increase their water availability?
- The over-consumption of water in the home (e.g. , long showers, washing car).
- Challenge to the immoral mind set of an arrogant political party who deem it necessary to concoct slanted surveys to aid a political objective.
- Global warming, drought.
- The use of our lakes by industries who do not have reusable filtration systems to recycle and reuse that water at the source.
- In east-central and southern Alberta there will have to be more water added to the south Saskatchewan River Basin to cover increased usage. This can come about by diverting the Clearwater River into the Red Deer River thereby creating more than 50% usage for east-central and southern Alberta (i.e. more water for irrigation and industrial purposes).
- A policy regarding the conservation and re-establishment of wetlands in Alberta. A balance needs to be created between restoring/protecting wetlands and the development of wetland areas for residential/commercial/agricultural purposes.
- Do not blindly listen to fear mongers who claim to be experts, making doom and gloom predictions based on insufficient data.
- Efficient water management is really the key point: educate people and industries to be more water efficient (with the on-going waste, it should not be too difficult to cut down on consumption). Just generalize metering and increase the price of water - just like in Europe and make sure its quality is preserved.
- A consistent and well planned water education conservation program be considered province wide. Wise use and water conservation education is in the interest of all Albertans.
- Maintaining wetlands as buffer for groundwater table.
- Better management and monitoring of feedlots, hog operations and municipal wastes e.g. sludge from wastewater plants should be composted in a regional site - this is a common problem with all plants. We need to pool our money together to manage a proper facility.
- Maintaining aquatic ecosystems should be the highest priority as without a functioning aquatic ecosystem. Nothing else will last for very long.
- Informing people to purify their own water for consumption by steam distillation or reverse osmosis filtration where the supply of water has a compromised quality for human ingestion.
- Tax benefits for responsible water use by industry, no inter-basin water transfers, encouragement of subsurface irrigation, maintain existing water flows in all streams.
- Alternatives to dams? Different water for different purposes.
- Management systems are important to sustain the present use, or improve on present use and at the same time be able to plan for the future.
- Albertans should already be evaluating the use of water for aesthetic use, (e.g. man-made lake communities versus maintaining adequate water supply and quality for human sustenance, agricultural and industrial purposes.
- Getting it where and when you need it is the most important. How can municipalities grow with wells impacted by in-stream flow objectives? Climate is measured in 1,000s of years. Item f: will find a balance. Item g: is vulnerable.
- Don't take a long time figuring out how to solve our water shortage problem.
- Inter-basin transfer of water should not be considered because of extreme environmental risk.
- The government should focus more on problems like this, and putting more money toward water research rather than focusing on giving themselves raises and liquor and cigarettes, thus more funding can go toward better water and more of it rather than getting people to quit smoking and drinking.
- Changes with legislation.
- At this point in time we must realize many challenges will be overlooked. One important issue to myself is that my future taxes may be raised dramatically because of this issue. Another concern that has not been

overlooked is the dramatic change in climate over the past decade. We must now more closely examine the role of global warming as it may be a factor in the climate change. Restrict industrial pollution a little more, etc.

- Weather plays a big role in water quality and quantity. Perhaps our government should ask anyone who believes in prayer to pray for more rain.
- Drilling programs within the oilfield should have to start dewatering programs (i.e. using the water over and over again).
- Water conservation will be more of an issue/monitoring/pricing of water increases/metering.
- Water quality/quantity is a metric that is symptomatic of the health of our environment. A mosaic of natural, restored and impacted lands in suitable ratios is important.
- Should the production water from natural gas be used instead of being disposed by injection?
- How should "trade offs" be evaluated, there probably is not enough water to provide more to all uses all of the time. Responsive (quick) decision making will be important but operations need to be adaptable. How should we place ourselves in the world? Do we have to consider the needs of non-Albertans, non-Canadians in our decision making (how do we feed the world)?
- As far as irrigation in south Alberta is concerned our present systems are maxed out. It is wrong to expand irrigation at the risk of present users.
- If we make land and water decisions, we will be aware of how they affect each other - often the water decisions are made without considering land or (land use) activities, therefore we run into pollution problems.
- Watershed management is key to healthy prosperous communities and water supplies. Voluntary involvement from communities is also key to this.
- Find a working balance - recycle, reclaim, conserve. Population growth rates - need data for water, use numbers.
- Innovation (as to shortage solutions) must be encouraged and supported.
- Wording of questions (challenges) are not "neutral" and often ambiguous.
- Integrate into school curriculum. Focus on increased efficiency/accountability of water use.
- Irrigation or the largest users must have additional funding to help increase efficiency and to reduce water usage thus [allowing] equipment and infrastructure changes to best use what we have available.
- Please push conservation of water. Stop influx of CFO. Learn to live within our limits.
- Do not sell water.
- Other countries and provinces using Alberta's water.
- Regardless of rules made, decisions taken, they are nothing without the ability to enforce. Recent budget reductions have led to cutbacks in enforcement officers in many departments. We cannot rely on the altruism of all individuals and corporations. We cannot afford the long-term financial costs associated with environmental repairs allowed to occur without enforcement.
- The climate change issue presents a challenge in GHG control. Alberta's water and land resources have potential to remove GHG's from the atmosphere.
- The divine right of oil and gas exploration and the contamination of water needs to be reexamined.
- How will climate change affect the present and future allocation and use of water (e.g. change in water temperature and associated parameters)?
- Current understanding and management practices for water will be challenged. We will have to adopt new ways of thinking about and working with water as our knowledge changes/expands.
- Quality of life - socio-economic accountability - government/public.
- Consequences for mis-use. Incentives for better use. Inter-basin water transfer.
- Conservation strategies (such as metered water) should be enforced.
- Making the changes in regulations that will be required to actually do something about the problems. These questions should be worded more clearly and more specifically (e.g. water will become increasingly scarce in Alberta).
- Water export - NAFTA.
- These questions are very poorly constructed.
- Public education as to water saving measures available.

- Funding for water treatment plants; growing population in Alberta places greater demand on aging plants, fear that plants will be unable to meet demand. People running the plant do not have the resources (funds, training, availability of technology) to do an efficient job.
- I believe the petroleum industry is pumping our water into their wells to extract the petroleum at our expense and to our detriment.
- Water is essential for life and much more than a resource. We need a (highest and best) human benefit policy for any use.
- How much infrastructure do we need to meet our needs? To subsidize high cost food production in excess of our needs is not wise. It is not wise to feed the growing human population with high cost foods (beef, pork), at the cost of out subsidies, water, air and oil.
- More quality research is required on inter-basin transfer.
- Over allocation of South Saskatchewan Basin.
- Water storage - both dams and off stream storage.
- Does Alberta need to continue to increase in population?
- Each level pay the same price per cubic metre.
- Rather than "significant investment" we should focus on making some tough decisions and enforcing strict controls (e.g. Is this industry in the right place? Are we putting water in the right place? Are we irrigating poor land?).
- Invest/promote water use reduction technology.
- Water conservation should be a priority, not infrastructure to provide more water. For a start, every household in a city or town should be metered, and people should immediately pay for what they use. No time to grandfather it in and homeowners should bear the cost as a part of the service. Irrigation should not be subsidized to the extent it is. If they can't do dryland farming they probably should let the land return to rangeland. Companies should pay for every drop of water they use and achieve zero effluents or pack up and pollute their own countries (e.g. ALPAC). The government has to quit subsidizing corporations by allowing them to pollute, inject crap into deep wells, and generally not clean up after themselves. If they can't afford to extract the resources, fuck 'em. The resources will still be here when the market price makes extraction economic.
- Better management. Protect the watershed Eastern Slopes.
- Need to focus on the reduction of removal of water from the water cycle (i.e. pollution, physical removal). Management of a resource must consider all influences and repercussions that may and may not be directly linked to man's activity. Long-term visions should be fed by short-term decisions.
- Short-sighted politicians who are vulnerable to responding to the biggest payers of contributions to party coffers.
- There needs to be a greater recognition of the role of aquatic systems in maintaining our environment.
- Incentives should be in place for those industrial facilities that allow for the treatment of wastewater that can be returned to watersheds. Also, there should be tighter restrictions on water that can be deep well disposed.
- I feel that the water in Alberta can and should be moved to the areas where it is needed and this can be done without negatively impacting the area it is taken from. We also need to store more of the water in the areas of the province where water is scarce.
- How do we change the way people think in regards to water usage and polluting of our waters? We need to educate people in regards to our future responsibilities regarding water use and the affects we are responsible for.
- Determine the import of water diversion a) for consumptive use b) watershed augmentation.
- Restrict new licenses for water use.
- Pollution to our river systems.
- Enforcement of existing acts that protect water resources, quantity and quality. Funding for maintenance and improvement of existing government storage facility.
- Domestic wastewater assimilation capabilities.
- Economic growth should not be at expense of sustainable aquatic ecosystems.
- How will we pay for all these issues and are we willing to make sacrifices to protect this resource.

- Complete the Meridian Dam.
- Water development encourages growth to the limit of its supply. Therefore no matter what Alberta does it will quickly use up new reserves recreating a supply shortage.
- Major feedlot operations and hog growing operations - and their pollution.
- Gain the knowledge on Alberta's groundwater aquifers. Work with well drillers to generate the data base. Sources: Accunap, EUB, CAPP.
- Using water more efficiently.
- The serious damaging effects which intensive livestock operations - now called confined feeding operations - will have on the people forced to live in close proximity to them. They should have local input and clout when it comes to approving them.
- The local municipality should have the power in deciding the approval of intense livestock operations. In Germany there has been an improvement in the quality of the water system. This is because the local governments have the right to make decisions about intense operations and water quality.
- Don't objectives usually come first? The challenges should be based on how to achieve the objectives (e.g. this 'goal' does not match the sustainable goal on the next page).
- Water conservation. Modify irrigation equipment (e.g. trickle systems reduction ???, water/land pollution).
- Challenge oil companies to use CO^{22} from coal-fired plants to recharge oil field rather than using water.
- One-fifth of Albertans provide for their own water supplies from groundwater (20% of population) and pay for it themselves (as a rule). More emphasis is needed for this water source in education of public, safe use of wells, correlation of groundwater data (e.g. mapping of groundwater from well logs in government's processing). Groundwater is probably the most economical and probably the purist water source available but more and more communities and farms are being encouraged to switch to surface water, at a great cost to our governments. I think this is a shame.
- Sustainable use of groundwater may soon be in conflict with economic growth i.e. loss of groundwater due to water flood applications by the petroleum industry.
- Until land and resource claims by our native populations are settled, issues with water usage and quality will not be settled.
- Enforce the rules that we now have.
- Contamination from unregistered hamlets and subdivisions.
- Clean water systems in general. Without clean systems the whole ecosystem could change over time.
- What about the ecosystem – insects, reptiles, animals, birds? Quit cutting down trees it is changing our weather patterns, which in turn causes drought. Select logging – no clear-cut!!
- Finding ways to recycle and reuse water. Move to zero or minimum effluent industrial and municipal plants.
- The pressure to make water a commodity will be great in the future. We need to safeguard against this at all costs.
- Industrial, agriculture and forestry activity must be considered.
- Factory farm pollution is a grave concern.
- Release of human effluent into the rivers, etc.
- The eastern slope watersheds must be protected at all cost. These watersheds provide the WORLD, not just Alberta, with clean drinking water. Remember our bodies are 70% water, without it we die.
- Upgrade all effluent to streams to tertiary levels.
- Negative effect of agricultural/industrial pollutants on municipal/private potable water supplies will likely increase.
- Control of how water is sold. A full review of senior licence holders should be conducted. These groups are from industries that assume unlimited supplies because of old thinking. The whole licence structure should be started over with consideration of the new knowledge and problems they caused.
- Unrestrained proliferation of industrial livestock production.
- We must ensure that the people of Alberta have a safe supply of drinking water at low cost.
- Oil companies should not be allowed to pump fresh water down oil wells.
- Concern over fresh water injection processes.

- Effective water management will require investment in staff resources to monitor and enforce the Water Act properly.
- Reuse of water wherever possible - recirculation in industry - grey water systems for gardens in residential - less wasteful sanitary sewer systems - flush toilets use and contaminate huge volumes of water.
- Externalities - NAFTA, FTAA, GATS. We've already been partially sandbagged.
- Industries currently using potable water should try and find new technology to try and limit the amount they use, or find a way to not use it at all. Agriculture would not be considered an abuser unless they are polluting.
- Water technology.
- The use of water injection in the oil industry - this water is gone forever.
- Limiting size of operation limits usage (e.g. CFOs). 10 small farms draw from 10 different areas whereas 1 large (10 farms size) draws from one area.
- First challenge: to review the Water Act Second: educate "rural, urban" folks with regards to water use/water cost and meters for everybody including farmers and agriculture societies, other municipal organizations. Third: encourage/promote watersheds and make it law to have livestock grazing away from water sources like rivers and lakes.
- Costs to taxpayers? Limiting heavy industry uses of potable water. We should not have to choose.
- Recreational use of water also needs examination.
- Land use practices will need to change to ensure water quality and aquatic ecosystems are protected.
- People-general public and industry must be encouraged and taught to use water efficiently and effectively with minimal waste.
- Alberta needs to seriously consider what it hopes to achieve with its so-called water management practices. This province already significantly depletes the available water to the detriment of populations in other provinces and countries. I think that instead of trying to manage our water, we need to focus on managing our use and abuse of this resource. Waste of water abounds throughout our society and this needs to be addressed. If water is becoming a scarce resource due to the overuse by industry, perhaps it is industry that needs to try and change. Our blatant disregard for this precious resource may one day threaten our very survival. Also, rather than trying to manage our water in anticipation of alterations caused by climate change, perhaps something needs to be done about the climate change itself. The Kyoto agreement which Ralph Klein has refused to ratify tries to deal with these issues, but apparently our government is happy putting dollars before the environment. All these comments pose additional challenges that need to be considered, but sadly the government refuses to address them or publicly denounces what is ultimately the most important question.
- What about return flows?
- Government departments must work together to maximize asset use.
- Water and wastewater treatment facilities are a critical part of the infrastructure.
- Water meters in cities.
- How the area plans are re-evaluated in light of the now emerging water issues.
- Rural subdivision and feedlot planning decisions must take availability of future groundwater supply into account.
- Environmental, habitat are issues that [are an] impediment to the efficient and economic use of water. Special interest groups should not be allowed to influence the movement or use of water to the extent they are trying to now.
- Demands to sell water and make it a commodity will increase. Once that route is taken, trade agreements will limit our ability to control how our water is used.
- DFO says anything that affects fish is under their control. This means Alberta's watersheds, not just water, are under DFO control. This is a Federal/Provincial jurisdiction issue. Get this sorted out now so I, as a resource user don't get caught in the politics later when Sierra Club comes.
- Better management of rivers and the streams that run into them.
- We need to find a balance between economy and environment, not make a choice between the two. Educate and encourage people to use water more wisely.
- Determine the best use of the water we have now.

- More than a water quantity and quality issue there is a great challenge for all political levels to keep working together to develop these strategies.
- Wastewater management will be critical in protecting source water supplies which is necessary for human and environmental health.
- Water conservation must not only be encouraged but rigidly enforced by harsh penalties.
- The challenge should be to find innovative technologies to more effectively manage water resources (recycling waste, grey water, collecting and storing rainwater) to ensure that all needs are met. Why be limited to what we currently know?
- The concerns of energy efficient animal agriculture.
- Upper watershed protection against logging, impurities, recreation. Pollution control of industrial activities and intensive livestock operations.
- Should water be transferred from one watershed basin to another?
- Preventing water contamination from soil erosion and soil/water salinity.
- Knowing when big is big enough. Doing a good job with what you have already. Develop a carrying capacity on the landscape (e.g. human and livestock). Plant more trees and put marginal land back into pasture.
- We should learn to use wisely the water that we currently have. Development should be considered only if water is sufficient and can be protected.
- The Alberta government will take a leading role to ensure the objectives of this water strategy are met.
- Must consider moving the water to where it is needed and used most effectively and efficiently.
- Education and efficient water use should be put to the people.
- Transfer of water - north to south.
- Management based on fact rather than public pressure from poorly informed individuals and the media. Many of the comments at tonight's (Calgary) meeting show an absolute ignorance of the facts, although the speakers show great conviction while stating their opinions.
- Irrigation is presently very inefficient with pivot systems. I believe that investment should go to more efficient water management. Possibly drop systems and new technology.
- Sewage treatment plants in urban centres improve on technology to ensure next to 100% clean water returning to rivers and streams. The real issue from [point of view of] water quality issues is actually in the hands of urban centres not rural!
- Everyone should have a water meter - this will conserve water.
- Pressure from other areas such as the U.S. to export water.
- Inter-basin transfer of water.
- I think educating the people of Alberta about how to use water more efficiently and use incentives to back it up.
- ILOs irrigation run-off, increasing irrigation usage, cleaning up industrial, farm and urban water for reuse.
- The challenges as written reflect the assumption that growth is the issue, that conflict is the issue and that options for doing business differently are non-existent. THE KEY CHALLENGE is committing to an ecologically sustainable economy.
- Guarantee information on "approved" potable water treatment systems to all private as well as public water users. At this time the private user is at the mercy of potentially unscrupulous water treatment companies.
- North American Water and Power Arrangement. U.S. demands for access to Canadian water supplies.
- Who owns water and who should have or control water rights is important. So is drought management.
- Knowledge - education through schools and media, helping the people of the Province keep abreast with new methods of saving water in and out of our homes.
- Keep up to prevent pollution sites, agriculture.
- Storage of water for later use is of utmost importance.
- I feel that care must be taken not to reduce current agricultural/industrial uses to accommodate other projects.
- Can we bring water to the places it can have the most economic benefit ,from the north to the south?
- Water conservation and recycling technology

- The current misuse of water for inefficient agricultural irrigation and flooding in the oil and gas industry MUST be addressed. The current practices are wasting valuable potable water and wasting a public resource for the benefit of a few. Additionally, maintaining viable fisheries and recreational benefits of water-based systems will also be an important challenge.
- The challenge of balancing oil and gas exploration with the limited supply of drinking water. The impact of oil and gas activity on the supply of fresh water. The fact that the government turns a blind eye to the environment when it comes to oil and gas exploration.
- The use of surface and groundwater for deep injection to produce petroleum.
- If the challenges are all assumed then they are hypothetical and of little significance. The real challenge is the desire and determination to retain and develop a guaranteed abundance of water for Albertans.
- Water is scarce in the south, there is a surplus in the north
- Stop fresh water injection into oil formations.
- Provincial assistance for rural areas – cost for ranching water falls heavy on the producer (wells, dug outs, etc.). City folk pay very little for theirs.
- Cities use of water and waste of water should be looked into - all you ask is agriculture questions.
- Groundwater issues also need to be addressed.
- Maintaining aquatic ecosystem integrity.
- ILOs, Hutterite colonies etc. seem to be randomly appearing in dry areas where they depend on underground water for their sole water resources. This can be dangerous for them and anyone on the same aquifer.
- The value of using the resource (water) in the province for agriculture and industry as opposed to letting water flow through or be exported.
- I feel we need more dams etc. for future use.
- Money if needed. Inter-basin transfer of water should be considered.
- Wetland degradation, therefore potentially affecting water quality.
- Wetland degradation, therefore affecting water quality.
- Environmental concerns - wildlife issues should be considered when making decisions about water (fish, water flow, ungulate populations).
- Maybe we should look at the big residential centres that use or need more water than us little farmers. Think ahead.
- Need to determine water inventory and present and future Alberta demand to be able to deal with increased U.S. demand.

did not indicate location

- Some questions do not apply to our area. Environment should investigate insurance companies who seed clouds. How does this affect our ecosystem?
- Injection of potable water in ground wells.
- I don't believe any small group of individuals can set the policy for many unless they are honest and not self serving people . They must not be a lobby group for any one industry, government or individual.
- One challenge will be to keep politics out of decision making (e.g. Meridian Dam feasibility study.
- We need a feasibility study for potential water storage sites from Edmonton South.
- Who values what and the different interests. Every stakeholder looks after themselves.
- Equity of supply between the "haves" and the "have nots."
- Mandate the use of dual flush 3L/6L toilets.
- Diverting water from one river to another to bring water usage in East central and southern Alberta to a level that can accommodate more water usage regarding irrigation and stock watering.
- Avoid inter-basin water transfer.
- Management (or mismanagement) of water allocation by irrigation districts. Ensuring fair and efficient usage by all users.
- Need to manage water, education to use water wisely, both domestically and commercially. Stop injecting surface water or potable water for oil recovery.

- If oil companies keep pumping water underground, water will become a scarce resource.
- Enforcement of the Water Act funding programs are limited.
- Conservation strategy. Contamination from surface runoff, particularly from agriculture.
- Inter-basin transfers - big issue in future, yes, but greater demand for management/conservation.
- Consumptive use of water for a power plant of aquatic ecosystems and economic growth must be balanced - aquatic ecosystems - indicator to the health of the environment.
- The opportunity for the government to sell our water to other countries or provinces.
- Reducing waste of the water supply at the household level.
- Water conservation legislation (i.e. Calgary water meters, require efficient fixtures in all new construction).
- Ensure Alberta keeps its water (what is required) and watch that the U.S. doesn't take control of it. Water is Alberta's treasured resource - don't sell it. There is no price large enough.
- Challenges must be addressed as whole not piecemeal.
- A serious challenge to our water strategy will be maintaining - restoring in some cases - the integrity of our watersheds - provides quality and potentially quantity of water.
- Enforcement (how and by whom). Government mismanagement. Monitoring properly.
- Conservation of shorelines (i.e. riparian areas) is the first line of defense regarding water quality in wetlands.
- Contamination of groundwater aquifers by hormones, antibiotics and other synthetic chemicals used by humans and agriculture facilities.
- What about the affect of urban demand on water urban pollution and use will be major.
- The economic uses of water are much more influential on water allocation than domestic use; especially in rural areas.
- Get more water - use efficiently e.g. domestic, industrial, livestock barns.
- The north has what industries need so put industry where the resources are not where the population is. More understanding of what we have (underground water)? How much and where?
- Need improved regulation. Increase awareness on water issues. Agricultural industry isn't all that bad.
- Enforcement of regulations and establishment of effective regulations is essential. Is the Government of Alberta going to put dollars toward water conservation for health of the environment rather than for some sort of development?
- The lack of water quality regulations must be changed legislatively to replace the current environment of suggestive guidelines - monitoring and enforcement of quantity of use and water quality must be greatly enhanced. Comprehensive watershed management plans must be made and integrated into decision making practices.
- Wildlife fisheries etc.
- What will we do when we run out of water? Ordering it from other places will economically destroy Alberta very quickly.
- Alberta must have the knowledge on quantity, quality and systems to adhere the above challenges. I'm not sure that today we have the knowledge.
- Don't allow oil to surface by water that is lost forever.
- Political pressures related to inter-provincial and federal "rights" to Alberta's water supply and distribution.
- Land use planning within Alberta as a function of quality and quantity of water supplies.
- Public liability for water quality issues.
- Feedlots
- Considering wetlands and surrounding groundwater as part of water source.
- Enforce existing laws! Separate agriculture from industry.
- Rocky Mountain House should pay for (all citizens included) purifying all discharges into the river - storm sewers included.
- Groundwater research needed.
- The strategy for water should include the enforcement of things that are in place now.
- Better enforcement of existing laws.

- Commercialization of water selling and trading water rights.
- How do you fairly allocate water?
- The quantity and quality of water is not there.
- Water allocation can be transferred to another person.
- Look after the water we have first - enforce present legislation.
- Inter-basin transfer is a bad idea.
- Have much legislation - needs to be enforced.
- Urban centers will need to store and maintain more readily available supply of water for more density of population - in public trust.
- Ethical sharing of water resources.
- It is expected that Alberta would be demonstrating leadership in developing alternate sources of energy to diminish affects of climate change.
- There is a lack of respect and knowledge within society regarding all aspects of water.
- Keep some of Alberta's water for Alberta before it all runs east into the Atlantic Ocean. Get more water onto the land to raise the water table. Consequently water will be easily available to drill more wells for future generations.
- There is no mention of the future outlook of Alberta's surface water quality and quantity. The challenges seem to focus on how industry and farms will lose if we don't do something about the quantity of water. But we need to really focus on the ecosystem.
- The biggest challenge is for the government and industry to put their efforts in developing technology and using the technologies that have been tested and proven to work already to protect contaminants from going into the land and eventually into the water table. These contaminants include animal waste, human waste and household garbage.
- Need to consider economic and population growth. These challenges are already upon us. Watershed plan is also necessary because water is only part of it.
- Listen to the problems policies cause. (motion since) Pollution, free coal carbon fuel cell power variable magnetic impulse burner systems (Turkey) super ionized water technology. Use above technology to build glass houses, spend on '0' point power development and you will wonder why all the holes.
- Water management should include reusing wastewater for irrigation, etc.
- How to create water when the rain and snow stop coming.
- There will be pressures to "export" surplus water; these should be addressed.
- Finding a balance between changing aquatic ecosystems and economic growth.
- Surface pollution of groundwater – extensive livestock operations.
- Sustainable growth is the key to developing the economy while protecting the environment.
- Water use should be used for primary use not luxury, food production, processes, basics to live. Not washing cars or watering lawns or like the Edmonton's waterfall that uses treated water.
- Effective water management will require significant investment in research and monitoring to sustain aquatic ecosystems in light of economic growth.
- The questions in this section are not neutral questions. They have been written to slant toward a point of view rather then to get an unbiased opinion on a topic. Questions should be rewritten to be neutral such as: do you believe that water will become increasingly scarce in Alberta?
- Exporting water to U.S. and then charging local people for previously "free" resource. I would be disappointed to see this.
- Conservation. Pollution of water.
- Government cutbacks and regulatory "reform" will continue to erode our quality of life, environment, and economic opportunities.
- Disagree that more water should be allocated to irrigation at the expense of the environment and sustainable economic growth.
- For once, leave economic growth out of this. We are talking about survival and health of the human species, all other living things, and the planet.
- Domestic use of water needs to be addressed as well. Early responsibility through our educational system should be stressed.

- Balance between agricultural expansion/urban and industrial growth and increase risk and potential for surface/groundwater contamination.
- Resisting pressures from companies to increase bottled water production and privatize the industry. Maintaining and improving the health of aquatic ecosystems to ensure a sustainable economy and safe drinking water in the future.
- The problems are not in the future, they are here and now: horticultural, agricultural, pollution.
- In the future, we may need to rethink our societal priorities related to water. Using freshwater for oilfield processes, irrigation and other industrial processes as well as inefficient household use should be reconsidered. Some type of full cost analysis process "including economic social and environmental considerations," could possibly help shift away from less desirable uses.
- Though water availability will become a serious issue in Alberta, I feel that the same will happen even sooner in the U.S. and that Americans will start to look at our water with an increasingly proprietorial eye. We as Albertans need to have a clear policy on water use and management before we sell our great grandchildren's water just to make a few bucks today.
- That industry may have to be more governed and limited in order to maintain, if not even try to improve, the quality of our natural waters. Once our waters are permanently damaged, it will be too late. Industry can still make a profit without putting such a high demand on our limited water systems.
- There should be no trans-watershed i.e. routing or selling of water across these boundaries. The problem of salinization of soils on irrigated land must be dealt with.
- Water for wildlife.
- Let's meet our commitment to the Kyoto Agreement. Better government enforcement of regulations - - agree.
- Strike a balance between economics and environmental issues. If a choice has to be made, then limit any development that conflicts with environmental issues.
- Divert growth to where the water is. Do not divert water.
- Educating the public. Define "growth."
- People, industry, etc. need to be taught and practice – better conservation measures.
- Without a sustainable environment, the economy cannot survive. The economy will have nothing to draw from.
- Emission of industrial energy pollution must be decreased and addressed as it affects Alberta's whole ecosystem, and ultimately the water supply in the trickle down effect.
- As water becomes more scarcer, it needs to be monitored more rigidly (i.e. Hutterites taking water without license or permission). Needs to be consequences.
- Reconsider farming cost of growing products compared to return. Is there a better return from other use of the land, value of preservation of land and water rather than commercial applications like industry and farming? Rather than subsidizing farmers with big dam projects pay them not to farm, put money into trust funds so that money will last. Make a baseline assessment of toxic effects on land promote reclamation projects. Think beyond land, water as resources only suitable for commercial exploitation.
- Identify past history and practices, before further use is allowed, and future use is identified.
- 100% must be put into conservation and efficiency plans before large-scale infrastructure projects are planned.
- Regulate industrial uses so that the scarce potable water isn't used and wasted in conditions where clean water isn't required. Encourage R and D to develop industrial methods that don't rely on huge volumes of water use. Enforce the cleanup of water used by industry before its released back into the environment.
- Growing Alberta population will create increasing demand for water for urban and recreational development (political implications).
- Conservation must be addressed. Enforcement of limitations to protect public interests not to give way to private pressures (e.g. hog farms). NAFTA, etc. - water is not a tradeable "good," it is a public service to allow life to exist (we can live without oil but not water).
- Sell water or allow water license transfers. Dams and reservoirs interrupt the natural cycles. Ducks and geese remain year round and significantly pollute reservoirs. Water in rivers stays open causing more bank erosion. Should dams, reservoirs be built?

- Kill the Meridian dam, and any other dam projects .....and kill them for all time ! ! ! Farmers and ranchers should pay for water and they should pay as much as municipal consumers do per gallon ! ! ! Agricultural and industrial polluters should have to bear 100% of the cost of cleaning up contaminated lakes, rivers, stream, sloughs, and aquifers....if they go bankrupt ....that's fine ! but they should then face prison time!
- We must have a balance of conservation and common sense. Weather trends work in cycles and I think the issue of lack of water will resolve itself along with management.
- Moving people/development to the water is a likely solution.
- Pressures on our water from other provinces and states.
- Maintenance of wetlands. Quality of water. Integrated water management. Need to focus in preventative not reactive when it comes to water issues (i.e. don't wait until all wetlands have disappeared, protect existing).
- With urban areas growing, there will be increased pressure on rural areas (resources) e.g. use of water, consumption of water.
- We are currently killing ourselves for economic gain with all the chemicals that are used to grow our food supply, that we can end up eating, drinking and breathing. Cancer it seems is almost epidemic. In dry areas, if aquatic ecosystems do not receive their share of water there will be nothing left. The quality of life is far greater than the material things money can buy and those systems are part of that quality.
- Land use management to protect aquatic life and water quality. Protect headwaters.
- Learn from our mistakes, past practices of doing things wrong. Let's work together to protect our water. Do the best for everyone not just for financial gain.
- In the rural areas, government should use health and education monies to assist small operators for their water test people. Maybe through an area treatment area.

what objectives should guide a future water strategy?

4. Do you agree these objectives should guide Alberta's Water Strategy?

Respondents indicated whether they agreed with the objectives presented. If they indicated no, they were asked what they would change.

north of Red Deer

- Priority of one objective (i.e. sustainable ecosystem over sustainable economy)? As economy cannot be sustainable without ecosystem.
- Be careful how it is carried out.
- An attitude that water belongs to future generations...as aboriginal people say..to the 7th generation.
- Reliable, quality water supplies does not imply inter-basin transfer.
- I would definitely prioritize the last line above the third line, and emphasize that without the knowledge to make effective decisions, the rest of the points are mute.
- I would place more emphasis on the first two points and less emphasis on the economic considerations. We can't have a sustainable, safe water supply if we are not prepared to possibly make changes in industrial land use or sacrifice some level of economic development.
- An economy, or a society can only be sustained by the water resources it HAS, therefore the objective should be to design an economy that will sustain the water supply.
- Water to the U.S. is a big concern.
- There must be some consideration of cost as well as benefit.
- We all know the problem – let's stop all these studies and DO something. We need ACTION! Now! In the last 25 years our water systems have declined greatly. What happens in the next 10 years?
- Under no circumstances should water be diverted from natural courses.
- Providing water movement or transfer is not part of the solution.

- If the problem and damage have not been identified, the problem cannot be rectified.
- Don't trade water quality for economic development.
- Fundamental objective: no inter-basin transfer.
- Water for people must be the first priority. If there is a choice between economic development and adequate, safe water for people, then people must come first.
- Diverting our water could have drastic change to our weather patterns, will not encourage people and industry to develop other parts of our province where water is available and will nor promote the frugal use of water.
- Fish, wildlife values.
- That Alberta's water be retained for Albertans.
- I would like specific meaningful statements. These could mean lots of different things. We would be better served by locating and living where this resource is: north of Red Deer.
- Implement all challenges on previous page and a confusing political bureaucracy can be avoided.
- Add objectives received throughout all of these workshops - listen to people concerned enough to speak out.
- Ensure that the younger generation (10-25 years old) is made very well aware and are socially responsible.
- The need to conserve scarce water supplies.
- Delete "reliable, quality water supplies......" This is secondary!
- However, I am opposed to inter-basin transfer and more dams and infrastructure. Conservation and efficient use of water. Not irrigated hay lands.
- Reliable, quality water supply for a sustainable economy does not belong on the list. This government should keep its nose out of private enterprise and stop trying to spend my taxpayer dollars to benefit private corporations. This government continually states it is getting out of the business of being in business but keeps thinking that they must stick their noses in it.
- I do not feel our water supply should be supporting marginal activities such as farming in arid southern Alberta. This area was never meant to support agriculture but through irrigation and water diversion projects, farming has been established. I do not consider these areas to have a "sustainable economy."
- Stop the destroying of watershed.
- Alberta's rivers have been polluted by unsafe farming practices (i.e. feedlots on rivers and creeks.
- Delete "reliable, quality water supplies for a sustainable economy."
- Another objective is to have effective water management.
- I agree with all the above and would include an objective that takes into consideration the impact of our water management strategy.
- If enforcement was carried out according to regulations.
- I agree and would add that without a healthy ecosystem we cannot achieve a future economy or anything else.
- In that order.
- Enforcement of standards by the biggest user/polluter, oil companies and CFOs.
- Efficient use of water. Limiting and regulating use.
- Study impact on others when changes made to infrastructure or water conservation policies.
- The knowledge necessary is being overlooked for the sake of economic returns to private industry but making it look like it's for provincial economic benefit.
- I agree with the first two whole-heartedly. The third point - we cannot sustain the economy through reliable, quality water supplies to the detriment of healthy sustainable ecosystems – so #3 must be carried out in deference to #1. If water management decisions mean dams, I am not in agreement with #4.
- I agree with the stated objectives. However, it should be made clearer that we are talking about all of Alberta's land and water elements. In addition, a recognition that economic development is not limitless, it must be constrained within the limitations of having a healthy and functioning Alberta ecosystem. Also we are connected to the other prairie provinces so we need to be considerate of their needs too.
- We must insure that we maintain healthy ecosystems – ecological sustainability is number one.

- Sustainable economy seems to suggest we should not change our water management habits if such would threaten the existing wasteful economy. We need a Kyoto Accord dialogue about water, at least involving Alberta, BC and Saskatchewan.
- A healthy ecosystem is our number one concern, this would ensure good drinking water. Sustainable (if there is such a thing) is based on the health of the system.
- Need to place more weight on healthy sustainable ecosystems than on sustainable economy. This means that economic expansion cannot be at the expense of conservation.
- The government needs to really consider ecosystems first. This will affect the quality of life for years to come. We are not the only ones who need the water supply. I hope that the government will not think industry first and subsidize industry before taking a long hard look at the repercussions of jeopardizing the natural environment. This government and future governments need to first consider the environment before industry.
- A decision that is "effective" for industry may not be in the best interests of the watershed basin.
- In addition, ensure that all effluent sources are monitored adequately to ensure water quality - this additional fundamental objective will enable us to respect the natural environment.
- Focus on bullets 1, 2 and 4, less on bullet 3 (reliable water for economy).
- Legislating stiffer penalties for pollution of water and bi-annual updates on our declining water availability using this forum.
- I am concerned that decisions may be made based on money rather than common sense.
- If sustaining economy or industry puts small farmers at risk, then I do not agree.
- These objectives supposedly have been ,and should have been, guiding the Alberta Government . Wise water management (e.g. Alberta Environment, if water is so important why don't we have a Minister with the fortitude to protect it?).
- Do not interfere with natural water movements and manage existing supply 'no problems'.
- The federal government should be on this like flies on pancakes. Water rights are still a big issue in Canada. My thought is water is worth more than oil.
- Agree, without diverting water from the north to the south.
- Add one more - a strong water conservation policy for all types of uses and users.
- Add: An effective system and policies for conserving water consumption.
- I agree as long as they stay as listed.
- Conservation is a large factor for consideration.
- Identification of conservation as a prime factor in the Alberta strategy.
- Sustainable provide-wide water plan to ensure these objectives. This is too large an issue and too expensive an issue to be left to municipalities.
- Funding sources for infrastructure.
- These are very simplistic goals to a very complex set of objectives.
- Users (over) should be monitored.
- Maybe the government already has too much power to control!
- I would also add that water should not become a privatized commodity sold to the highest bidder (i.e. U.S.). Water is a basic right that all people should have access to.
- No trans-boundary or inter-basin transfer of water. Ecological protection must be written into legislation not just as part of management principles. No net loss of habitat based on water allocations.
- I would add to the last item, "in the absence of adequate knowledge, the precautionary principle will be the guide, even if it means halting an economic opportunity."
- A sustainable economy while important should be the last concern.
- There are problems with the definition of a sustainable economy - little of our current agricultural and industrial practice is currently sustainable - we do not want to build policy on unsustainable economics.
- Approach with great caution any ideas of diverting flow of existing rivers.
- Development of appropriate industry/agriculture for dry areas, for a truly sustainable economy in the south of province.
- The water strategy should recognize that shifting water resources between regions is in effect taking resources and opportunities from one region of the province and shifting them to another.

- Conserve the water for production of the good change and educate all the people in Canada as well as Alberta, about the sustainability of clean drinking water for all and its dire circumstances when it fails.
- It's a good start - but irrigation/alternatives/metering of industrial/rural use must be considered. Will water be taxed - interest form of taxation? Will Alberta water be exported to U.S.
- I agree with all the above statements but we should not have economic growth and development being more of a priority than water conservation and protection. If the water resources will be sacrificed, either in quantity or quality then development should not be approved.
- Reliable, quality water supplies for a sustainable economy. If industry requires quality water supplies, it is not the responsibility of Albertans to provide and pay for it. It is also industry's responsibility to return effluent that is not harmful to the ecosystem. It is government's responsibility to set high standards regarding effluent and to ensure these standards are being met.
- Objective 1 is key to achieving the other objectives.
- Expectation of public/residents to reduce waste and use water wisely.
- Wetlands are reclaimed by farmers.
- Scientific basis for water use - consider reuse, reduce, recycle - minimize water withdrawals.
- All favourable objectives are important, but efficiency/cost benefit ratios should also be an important objective.
- Guidelines/regulations and enforcement.
- But, should develop knowledge to improve our understanding of water use/allocation among users/environmental implications to strive for a water management strategy that takes this into account and look for progressive ways to use less water and maintain current demands, or reduce demands even in the face of economic expansion.
- The first three should be in priority order.
- All in all, seems to make sense to me.
- Does "sustainable" mean current economy or large growth. We may be too focused on growing.
- Stricter water use guidelines for industrial purposes. Do they need to use potable water sources??? Farming must be further scrutinized as a business. Especially large hog and beef operations. Cropping practices must also be improved to reduce the amount of fertilizers and pesticides entering the watershed. If these factors are not controlled most efforts will fail. The water bodies in northern Alberta are largely atrophic and are undergoing a natural dying process which is largely accelerated by organic biomass entering the system (i.e. pulp mill effluent with huge amounts of B.O.D., manures, raw effluent, etc.).
- More good use of water in southern Alberta.
- I think there also needs to be a strong emphasis on conservation and perhaps incentive for business/industry to conserve. Our youth must be educated and technologies implemented to promote conservation.
- It is the proper application of the knowledge that is critical. Too often political decisions are made that do not incorporate the best knowledge.
- Add: the application of code of practices for all industrial users of water, by water, or that could effect water (timing, quality, quantity).
- Do not change watersheds by building dams or piping water for a few individuals.
- Money will determine Alberta's strategy - not personal requirements.
- Compliance, enforcement to adequately ensure the above first three. "Knowledge" itself will not accomplish this, as the (1) almighty dollar in many instances governs, (2) user is in a rush to complete a project, (3)there are still the "jerks" out there who don't give a damn.
- More emphasis on sustainable ecosystems for wildlife and fish and riparian areas as well as the other issues mentioned above.
- I agree with them, but the third point should include maintaining a sustainable ecosystem. Many plants and organisms rely on water for a variety of reasons (life cycles). Humans are not the only existing species.
- I think ensuring industry does not contaminate the water supply (and the public) by dumping wastes, etc. is important as well, and trying to introduce stronger legislation to enforce that.

- Something about "efficient" use should be included.
- The Province must have the trust of the public regarding the Province's management of the water system. Trusted third parties must attest to the validity of the Province.
- Effective water management decisions. Depends on who is "management" and whose side they are on. Mine, or that of the pipeline to the U.S. boys.
- Establishment of a short-term (10 year) and long-term vision (100 years) of watershed management.
- The only concern is with #3, need to define what "reliable water supplies for a sustainable economy" means. Do we sacrifice healthy sustainable ecosystems to meet water supplies for a sustainable economy. There is no trade off here, the economy gets the amount not needed for a healthy ecosystem.
- Knowledge should be the first objective. Without knowledge, the other three objectives cannot be achieved. I suggest the government take a good hard look at the Departments of Environment and Sustainable Resource Development - the departments who have the people to find the answers we need and consider proving that water is a serious issue that the government is ready to tackle by giving these departments the mandate and the budget to do so.
- There needs to be a balance between the ideal and the affordable.
- It should be clarified whether these four objectives are intended to support existing industry and population or to support the unlimited growth of future industry and population.
- Forest replacement.
- "Reliable, quality water supplies for a sustainable economy" - don't think this is an achievable objective and should be dropped.
- Enforcement of existing laws that govern all water use (i.e. withdrawals, pollution, filling in of wetlands, etc.). Higher fines for abuse.
- Education of the public.
- Add - restoration of drained systems to improve current wetland ecosystems.
- We need to somehow reference the environmental/economic impact of ever marketing water outside Alberta. Whether this occurs in the short or long-term, it should be recognized as a potential opportunity for diversification or a serious environmental issue.
- First guarantee that natural ecosystems are sustainable before reliable water supplies are provided for economic purposes.
- Healthy/sustainable [ecosystems] to take precedence over industry/economy demands for growth.
- In cases of conflict, long-term water quality should take precedence over industrial development, especially when it involves large-scale agri-business.
- Oil companies should be searching for different ways of mining oil instead of using all that water.
- Affordability, accountability, and equitable solutions, not regimental ones are desirable.
- Industry given preference over citizens regarding water quality: if water is clean enough for industry, it's good enough as that's our priority, is the attitude.
- Agriculture should hold priority over newer industries that move in.
- Alberta should lead the way and not wastewater by directing water to the south to keep the cattle ranches, farms, etc., over producing.
- The economy is mentioned, but the needs of people should take precedence. What governs the water management decision-making process, the economy or the people? Where does NAFTA fit in? Make sure the needs of Albertan people (not businesses, mega-farms, etc.) are considered first of all.
- Water is not a commodity to be bought and sold by business, it is a public resource that requires scientific/public control not short-term political expediency in deciding its future
- Include flood damages.
- Educate Albertans to conserve water at all levels.
- Sustainable economy for what population where and for what year? We are already beyond the limit of sustainability in some areas of the province. Water transfer for agriculture or industry is not economically viable or acceptable.
- What is going to ensure this happens, especially since industry and government can change "objectives" overnight.
- A safe, secure drinking water supply must take precedence over supplies for a sustainable economy

- If the past practices and impacts have not been identified how can future plans be made and above objectives can't be applied?
- I see no mention of watershed management. Perhaps water management in this context is meant to entail more manipulation of water through physical structures. We should be looking at ways to maintain/restore our watersheds.
- Monitor industry more closely (e.g. logging too close to streams, rivers, etc.). Pipeline crossings; how they are done? Monitor closely for leakage. Oil companies; how they use water.
- The need to acquire a greater level of knowledge and understanding of the current state of our water resource is key to ensuring that we will continue to have a healthy hydrology system within Alberta. This understanding, along with the development of an evaluation system that will gauge the quality, will be one of the most important first steps. I have found that the current identification and classification system within Alberta is outdated and flawed to the point that natural resource managers are unable to plan around this system.
- 1. Limit growth. 2. Encourage and insist on water conservation ideas and technology. 3. Institute steep fines for polluters of all kinds. 4. People and industry need to locate where the water is, not vice versa.
- What do you mean "reliable, quality water supplies for a sustainable economy." Need to practice and require water conservation and non wasteful consumption practices.
- Develop acts and regulations that require strict controls on the distribution of water to industries to ensure sustainable flows for aquatic environment and domestic use and ensure pristine quality. Acts and regulations must monitor quality and specify measurable goals that are defined by legislation.
- Note: sustainable economy does not mean constantly expanding economy.
- Exclude "Reliable, quality water supplies for a sustainable economy" because it does not mean to sustain the current level of industrialization but means industrial growth which puts increased demand on the water resource of this province which means more dams, expansion of existing dams, etc. We have more than enough industry in this province especially those that are destructive to the environment and the aesthetic value of this province. Enough of the province has been destroyed.
- Federal regulations (i.e. fisheries acts and regulations) need to be followed and understood by Albertans, including private landowners.
- We have a finite amount of water yet we expect to serve an increased population and want to increase oil, gas and lumber operations. We can't keep increasing without new technologies, aggressive conservation and political will.
- In the 3rd objective, I would suggest replacing the word "economy" with the phrase "quality of life." The term "economy" is too exclusive.
- Government should not be allowed, by itself, to make water decisions. These decisions are too important for one group to decide alone. It should be done as a multi-stakeholder panel of citizens, industry, agriculture and government.
- The main objective should be to sustain a healthy water cycle because without that there can be no economic development.
- I would change, "healthy sustainable ecosystems" to "healthy sustainable natural ecosystems."
- Ecological integrity is a luxury. If our economy is not healthy no one will care.
- But would like to understand what the "ideas" group means by healthy sustainable ecosystems.
- Ecological protection and drinking water quality must take precedence over "allocation" of water for industrial purposes. Dams and water diversion are NOT acceptable.
- Change the third statement to read "reliable, quality water supplies for all inhabitants of the province"– not just humans.
- I agree with the objectives, but I am sure that my interpretation of them is far different than that of the Klein government. Water is not simply a commodity but a necessity of life. We must value water as more than something necessary to promote industry and economic growth. We need to stop treating our water as if it were simply an expendable item; allowing oil companies to dump billions of litres of it down into depleted oil wells where it is lost to the ecosystem is immoral and reprehensible, and yet most people don't even know this is happening.
- Point three should be: constant water quantity supplied for a sustainable economy and safe water quality returned from economic uses.

- I would stress knowledge. Decisions shouldn't be made by politicians but by those educated in water resources field. That coupled with increased education to the general public so that everyone can make an educated decision.
- "Reliable quality water supplies for a sustainable economy" seems like a loaded statement. It really depends on how much and whether or not it is consumptive use or non-consumptive. Albertans may be forced to make difficult decisions regarding which kind of industries we want to promote given our supply of water and our human and ecosystem needs. I strongly agree with the other three points.
- Who decides a sustainable economy? Can't be just industry or just government.
- Sustainable yes, but sustainable development no. We have to learn to live within our means and not destroy our ecosystems and ourselves in pursuit of infinite economic growth according to the current doctrinal system.
- I question the words 'sustainable economy." By whose definition? If only industry is the determiner. I don't feel confident that a sustainable environment will be considered.
- Yes. but would also add assisting water quality scientists to achieve their goals of improving water quality in our lakes.
- Not a bad objective, but I would add more emphasis on storage and reuse management. And under knowledge include a high degree of measurement activity. Information on both quantity and quality (i.e water available, quantity used and purpose, quality of input, output, etc.). I'd like to see incentives for quality and quantity restoration.
- However, you need to add education to that mix. People. if educated more, could make better decisions and realize what they are doing when they waste water.
- Suggest the four objectives be placed in order of priority. Suggest we need to reverse the order of the last two.
- That all Albertans continue to have the same access to safe water sources. That water not be another avenue for class division in this province as the government looks at privatization. Water is a basic element for sustaining all manner of life, not just life of those that can pay for it. Privatization is not the answer to everything!
- Although implied in 1, 3 and 4, conservation rates a focus as an objective.
- The fourth one should read: "The knowledge necessary to make RESPONSIBLE water management decisions for Albertans." "Effective" is a weasel word that can be taken to mean just about anything -- effective for whom?? What are the criteria for adjudicating "effectiveness"? "Responsible" decisions are what we need.
- Objective 3 should be qualified to indicate that some areas of the economy may not be sustainable if the water supply becomes the limiting factor.
- Science-based decisions! Not decisions based on "what has always been!"
- Rivers have value beyond being water pipelines. River ecosystem is mentioned but there is also human culture associated with the river.
- Healthy sustainable ecosystems should be first principle – sustainable economy should be adjusted to available water supplies.
- Protection and management of existing groundwater and surface water resources.
- I think the word "sustainable" is used too loosely. The definition of this word should be looked up and accordingly, these words changed. It is inevitable that the economy will grow and continue to deplete the water of Alberta. What needs to be addressed is how are the effects of this growing economy going to be mitigated with respect to the aquatic ecosystems. Stop fooling ourselves, development and growth are going to happen. What do we want to save and how? That should be the question.
- A clear statement that individual economic interests are of secondary importance when compared to drinking water and sustainable ecosystems e.g. intensive livestock operations appear to have the potential to contaminate our water supply, yet the government is making it easier instead of harder to establish ILO's. If ILO's are not required to have low environmental impacts, then they are being subsidized through degradation/depreciation of natural capital when compared to more environmentally benign agribusiness.
- I believe Alberta's water strategy should also incorporate the precautionary principle to account for how global warming may affect the hydro logic cycle in Alberta (both directly and indirectly).

- Economy cannot keep growing at expense of water ecosystems.
- We must alter the economy to the environment and the water strategy, not vice versa.
- I do not agree with the use of "sustainable." It must be more clearly defined. I feel sustainability is a vague concept, often used with no real understanding behind it. What is a "sustainable ecosystem"? What is a "sustainable economy"? If these terms are used in the way they have been regarding Alberta's forest industry, our water strategy will be in serious trouble.
- Environmental protection should be an objective and identified explicitly.
- Who cares what impact the water supply has on the economy or in other words, on industry? We should be most concerned about the impact that farming and industry are having on our safe water supply.
- More education and knowledge toward the public. This will address the public more clearly about the water issue.
- There is no mention of legislation or laws that will be implemented to enforce healthy sustainable ecosystems, etc.
- We must think in terms of sustainability not growth.
- I agree with all the objectives except the statement about "reliable, quality water supplies for a sustainable economy." This latter statement would suggest moving water to meet the demands of agriculture and industry. What needs to be considered is moving industry and agriculture to areas that can sustain them.
- In a 'have' province like Alberta, I think we can afford safe drinking water. I take issue with the words 'sustainable economy.' We need clean water, sustainable or otherwise.
- Also, add a commitment to demand management as a path to sustainability.
- But the question should be which order should these objectives be placed in.
- I agree with the above, especially reference to a 'sustainable economy" instead of growth. I would just add explicit mention of conservation as part of management.
- Add one: making sure industrial and agricultural users (businesses) pay prices for water that reflect scarcity; otherwise the objectives are fine.
- I would delete the third item. Concerned that this objective would take priority over others in policy development. I'm not against industry or economic development. I just don't want industrial needs driving water policy. The world does not need dams and water diversion projects.
- But you can't do it without limits on population and/or economic growth.
- Define 'sustainable economy' in a way that recognizes the limits imposed by nature, then I would agree.
- Education of public – knowledge of the value of fresh drinking water put into perspective on a global scale.
- I agree with the above, however in addition water should be protected and managed for the benefits of Albertans and the Alberta economy and not as a saleable commodity.
- Use knowledge already available to make decisions as delay for "'studies" limits necessary control of our water.
- The ability to ensure Albertans actively use this knowledge may need government intervention. Reasonable legislation and enforcement where necessary. Aiding in implementing positive change.
- "Reliable, quality water supplies for a sustainable economy" means the government is selling out our resources. Piping water to the south or inefficient use of water and pollution by industry should be stopped.
- "Sustainable economy" must be a secondary issue i.e. water flooding severely effecting lake levels.
- I am afraid that our government will not interpret these values correctly. Sustainability is wide open to misinterpretation when action affects choices.
- Focus on sustainability and reduce pollution, increase inspections, and prod -or legislate- industry to practice environmentally friendly practices, even if it affects their bottom line. Change their bottom line.
- We should place water as a free source of energy, start working toward controlled sales to U.S. How do we tax water? We need a system of generating money and use this money to protect water for the future.
- Also important is increasing research and development into water conservation technology. If we develop more water-EFFICIENT practices in agriculture and industry, then we can more easily meet the above objectives (i.e. having enough for everybody's purposes).

F2

- Strong enforcement [against] any type of violator that affects the environment and water.
- We need to re-examine the paradigm of economic growth and environmental protection being incompatible. We need to look at new kinds of growth and development, and new ways of thinking about water issued.
- I would place knowledge before a sustainable economy, because it is difficult to make a decision regarding sustainability in the absence of relevant knowledge achieved through research.
- Add economic tools/structures that encourage the healthy ecosystems goal.
- Do not think that the Province should attempt to bring water to areas where it is limited to promote economic growth.
- Would not approve of major water diversions to support economic growth.
- Aquatic systems are more important that economic growth.
- Reducing growth from where there is no water to sustain it. Redirection of water is just not ecologically possible.
- Reliable quality water supplies for a sustainable economy without negatively impacting aquatic ecosystems.
- Knowledge needs to be gathered on what is wise water management. There are assumptions that shipping water about the province may be wise, not so. Water doesn't flow up hill. Water soluble components are transported by water and may end up in places we do not want them.
- We should not be forced to sell our water to the U.S. through trade agreements. Large oil/gas companies should not be using our clean water for extraction!
- I am not sure that a sustainable economy should be the objective of a water strategy.
- Have serious concerns about having a focus on sustainable economy. I think it's this focus on economy that has led to many of our current concerns. I'd keep items 1, 2 and 4.
- Economic growth must not be the primary objective. Maintaining health sustainable ecosystems may mean limiting industry for the safety of all Albertans not just some company's bottom line. As an Albertan I should be consulted and listened to, not just consulting groundwater specialists who have a vested interest or industry who cares about their bottom line.
- Where is reference to enforcement?
- As one of the largest users, farm irrigation is the least efficient and most wasteful of all users. Dirt canals are unacceptable waterways.
- Effective monitoring and compliance policies. Realistic limits on resources.
- 1) If we are already finding the amount of water available is frequently not enough to meet our needs (industry especially), and we expect a drier -or more consumptive use- future, the goal of "reliable and quality water supplies for a sustainable economy" is not well enough focused - should be more like "ability to better manage the water supply, consumption priorities and improve conservation and efficient use of water, to optimize the economic use of this key resource." 2) In addition, I do not see any goals relating to the recreational use of water bodies, which is important to many Albertans, on the grounds that they would be very upset if current opportunities were to disappear.
- Mechanisms (management practices, money etc.) to allow for adaptation to changing circumstances in a variable prairie climate that is prone to periodic drought cycles.
- Depends on definitions of supply versus sustainable economy, realizing we are one economy, but BASIC human needs, for us here in Alberta, in Canada and the world must be met.
- No further diversions of natural waterways - especially to the U.S.. Absolutely no allowable sale of water as a commodity.
- There should be a focus on ensuring that industry and agriculture conserve water. For example, water dependent industries should be required to use recycling technology and intensive agriculture in areas susceptible to drought should be required to accept the risks of not having enough water or change their practices to drought-friendly ones.
- Add effective control measures for prevention of pollution.
- I am concerned about our disposable society that creates pollution in this production and leaves this material in landfills that eventually leak into the water systems.
- Establish a ministry to manage/monitor allocate/protect/distribute.

- Add - "eliminate excessive subsidies for supply of water" - particularly in ongoing management and delivery costs.
- Yes, but to a lesser degree, point number 3.
- Number 3 - should not move water in large quantities from north to south. Water being used to pump down oil wells is lost forever - another method should be used to do this that does not use water. Factory farms must properly dispose of waste so that water is not contaminated.
- A focus on accountability to ensure that 'the keeper of the gate' fulfills a clear and concise mandate of checks and balances.
- Conservation initiatives, programs and rewards for conservation.
- It is hard to disagree with Motherhood statements.
- I don't agree fully with the objective "reliable, quality water supplies for a sustainable economy." Having reliable, quality water supplies for a sustainable economy presupposes that Albertans support further development of infrastructures to bring more water to those parts of the province which don't presently have enough water - primarily southern/eastern Alberta. Oil and gas industry and the agriculture industry (primarily irrigation in southern Alberta) are, I believe the largest users of potable water in that region. Certainly, the oil and gas industry probably is across the province. I think it is more important to ensure safe, reliable water supplies for daily living and ensure that industry is encouraged to identify water conservation methods and alternate sources to "harvest" oil and gas.
- Order of priority as listed.
- Add education and conservation.
- Question "sustainable economy." Perhaps alternative crops and conservation and recycling should be studied.
- Just enforcing the water act would go a long way to help our water supply.
- Use of alternative technology by industry. Yearly review of industrial licenses.
- Educate Albertans, especially homemakers on how to use water more wisely in and around the house.
- It depends on what is meant by "reliable, quality water supplies for a sustainable economy."
- There are already strategies, in-place or waiting, which can fulfill these objectives.
- I do not believe that a strategy for this resource should be limited to the 4 fundamental objectives identified.
- Give more money to local municipalities for proper filtration.

Red Deer and south

- Sustainable economy is one thing – expanding in dry areas is counter productive.
- That the economic funding be made available to do the above. Water must NOT be sold.
- However, Dr. Taylor and I would interpret the above very differently. Healthy and sustainable ecosystems are the only basis for
- I would add "The need to make all Albertans aware of the importance of water in their lives and the need to be educated on the effective use of this previous resource to the extent that Albertans make changes in their lifestyle (major or minor) in using the resource."
- I like these objectives. I just want to be sure that the fourth objective would include encouraging (adopting/legislating) industry to look at using non-potable water where practical and possible (i.e. effluent irrigation/effluent or poor quality water for oil recovery, etc.).
- A sustainable ecosystem supercedes any higher demand by industry and agricultural uses.
- The watersheds must be protected at the expense of economic growth.
- Add strict enforcement of rule and regulations.
- Government must listen to experts like David Schindler and put the needs of Albertans ahead of industry. What has to be decided is what is sustainable growth - 10% growth is not sustainable. The government must develop long-term strategies.
- Water conservation can be extremely effective to minimize the need for developing new water infrastructures.
- I see knowledge as a fundamental requirement not an objective. As such, I believe protecting quality of water from existing development not just quantity as an issue.

- Promote wise use of water where it is available. Why move water (expensive) when the people and industry etc. can move cheaper and with less if any environmental damage to the rivers and streams than would be caused by transferring water.
- Add enforced guidelines on abuses of our water.
- A conservation, preservation orientation should be fundamental to any water strategy.
- Communicate and promote conservation measures and awareness to increase the understanding of water management responsibilities of municipalities, irrigation districts and conservation authorities throughout the province.
- I agree as long as one realizes certain limits to economic growth.
- Should our water be sold?
- There must be policies and laws that will guarantee water resources through conservation and wise usage.
- Make grey water recycling mandatory.
- Again, the regulations that this government brought in to supposedly bring standards to these factories (farms) has fallen short. The regulations as they currently are went back at least 10 years or 10 step backwards in regards to safeguarding our wells and our waterways.
- True quality of life should come before economic interests. The total cost of any economic "benefit" must be considered.
- What about a fifth? Albertans who value more, treat our resources with more respect, and do whatever is feasible to conserve, preserve and whatever can be done to reduce, re-use and recycle water and refuse to let anyone or any administration control our water supplies.
- Remove "idea" in number 3 as it implies building infrastructure, which is a last resort. Add improving/changing water management practices and regulations.
- There needs to be more scientific information available before tinkering with any ecosystem. Personally, I don't think you can outwit mother nature. What if rainfall or snowfall exceed expectations?
- As long as it does not include more dams or inter-basin transfers.
- Define sustainable economy. Is that to sustain the current economy or sustain economic growth (i.e. more irrigation in areas that are impractical and inefficient). Golf Courses, inefficient use of water.
- Water conservation must be a fundamental objective. So must tailoring our economy to use only the sustainable supply – not
- If sustainable economy means net loss for Alberta's rivers through sand, gravel, oil, gas environmental footprints at any cost for immediate gain, then No!
- While I agree drinking water is important, this accounts for only 52% of overall demand which suggests it should be the least problematic to solve.
- Prioritize what sectors use how much water. If the rate of expansion of our cities continue will there be enough water for agriculture and industry?
- Something about the importance of conservation by all users: matching demand to the available supply.
- But in the right inter-linked context, not in a hierarchy with perceived ranking which is subject to change (knowledge should never be last).
- "Sustainable economy" precludes allowing continuing wasteful practices of water. We must change our industrial and domestic practices (and conserve) before writing a blank cheque to "sustain" this wastage.
- As long as the four listed are not in order of priority, I agree.
- This is a silly question. Who would disagree with something so small and obvious. I hope you did not spend too much time or money to come up with that one. Shame on you.
- I would ensure that the fourth parameter was in place before decisions were made regarding the others and would define economic sustainability; as in for who is it sustainable, this generation or others to come?
- Add creation/maintenance of water for recreational use to the list.
- The objectives stated are fine. Just add as an "objective" that covers research and development for more efficient use of water resources. Make sure that grass roots (sub watersheds) level activities are recognized and supported in meaningful ways.
- However, I would put safe drinking water first.

- Great effort by government to limit deep well disposal of industrial wastewater.
- Incentives for conservation of water resources.
- Note that many big intensive livestock operations within a fairly small area can have a very harmful effect on surface and groundwater in that area and beyond if the resulting large quantity of animal wastes are put directly into the surrounding environment.
- What do you mean by a "sustainable economy?" If you mean that it allows for growth and does not have a negative affect on the economy's growth–great. If it means that the economy will be sustained at current levels–disagree. I would much prefer that Alberta Environment didn't have to make water decisions but they put mechanisms in place to help Albertans make informed decisions on water consumption and wastewater production. In doing so, I would hope that this framework would steer Albertans toward sustainable water usage and much reduced water resource contamination.
- There should be no privatization of our water resources. The Kyoto Accord should be ratified.
- Need to add the principal of using economic incentives (i.e. charging market rate) especially to agricultural users who have been getting a free ride in the past with vested water rights.
- Economy and water management are on opposite sides of the table.
- Add the funding and resources necessary to enact the water strategy.
- Sustainable economy is not the same as growth. If the government continues to encourage industries that require large amounts of water the problem will continue to increase as well.
- Yes, but developing a sustainable economy, to me, means sustainable development in its true meaning: integrating environment, social and economic knowledge and considerations. This also requires use of best practices in consideration of sustainable development or thinking outside of the traditional box to seek solutions that we currently don't see because haven't tried to look.
- Plus: industrial usage, recycling.
- I feel Alberta Environment is often pressured by the monied developer. The lowly civil servant "caves" in.
- I would take a very hard look at irrigation in Alberta and determine if it actually is adding value. I would be very strongly opposed to building new irrigation infrastructure until the current irrigation infrastructure was being used on a cost effective basis.
- We need a strong focus on water conservation and the stimulation of economic growth in NON water intensive sectors.
- Extend regionally based systems in rural areas.
- Need to consider the environment before money because if the environment crashes so will the economy.
- Change the word "effective" above to "proper." Also, any adopted strategy should be based on scientific data, not politics or fear. Walkerton and North Battleford appear to have fostered much fear and political over-reaction.
- Add some provision for guaranteed access to water for Albertans so it's a priority over potential trade commitments regarding water.
- Sustainable in the Alberta Governments view means growth. Limits to growth and thresholds must be discussed and determined.
- Legislation must be instituted to minimize the ongoing contamination of water supplies.
- I agree with 1, 2 and 4. Our economy does not have to continually grow and expand. Maybe small, controlled growth over time is best.
- Change to: reliable, quality water supplies for a sustainable economy where current water availability now exists.
- Reliable quality water supplies for a sustainable economy is inconsistent with the first objective - healthy, sustainable ecosystems.
- The four stated objectives are good motherhood, but the real test and perhaps most important objective is the ability to respond and react in a timely effective manner to changing circumstances and particular needs.
- Education strategy/programs for public.
- The last three items should be qualified. Item 2: "A safe, secure drinking water supply" should not mean loading it full of disinfectants. What alternative means of purifying the water are available that are non-

toxic (e.g. ozone)? Item 3: "Reliable, quality water supplies for a sustainable economy" has to include looking at industry to see what we can do to use less water rather than simply looking for ways to produce more water for a growing economy. Item 4: When do we know the knowledge we have is sufficient to make a decision that meets our criteria long-term?

- Need to have a plan for pollution.
- Recognition of centrality of water to decisions in agriculture, forestry, urban development - respect for environment - not isolated issue.
- Industrial users of water should not be using surface supplies; they should be reducing water use through technology and what they use should be non-potable.
- Reality – instilling of: that there will have to be a change in how everyone does business relative to water – includes industry, municipality's approval of growth and development, the individual. Integration of services within government's to achieve this.
- I agree with the above, but would add that priority of no or low consumptive usage should be mandated. For example, if a farmer can generate "X" amount of economic benefit on a given amount of water, and someone else can generate twice that amount of economic benefit from the same amount of water, the higher benefit should prevail. Occasionally, the zero-consumption approach of just leaving the water in the river may prove to be the most lucrative use, in tourism/recreational situations. Present water policy does not seem to recognize that option, and it should.
- Sewage and wastewater management should be part of this.
- Water usage is easily monitored and controlled; we all use different amounts so people should pay for what they use.
- Water quantity for recreation.
- Increased education of water conservation.
- I would add "and the process" after "the knowledge" in objective 4. There should be a way/process to keep the public informed and involved and have a "feedback" function about the effect of water management decisions.
- Greater focus on incentives for better water management and taxes for wasteful use of water by both industry and the public.
- Method to allocate water among competing uses.
- 1. Education of Albertans - how to use water wisely. 2. Communication and consultation with Albertans. 3. Water belongs to the earth and all species so must not be treated as a private commodity to be bought, sold and traded for profit. The province is the guardian of the water and should adhere to this principle.
- Explain how to conserve water - by all sectors - residential, industrial and agriculture.
- Some proactive effort to reclaim rivers and wetlands. Sustain abundant healthy ecosystems.
- Political will to make tough decisions regarding limits to development in areas that don't have sufficient water (e.g. the oil sands area).
- Knowledge is the key objective - without it all other objectives are unattainable.
- There should be a reference to water conservation (not just universal water meters for Calgary but also better usage of irrigation water by the agricultural industry). What about golf courses? Frivolous use of water.
- Climate change - specifically loss of glacial sources.
- The 4th objective should be more clear (who has this knowledge?). Promotion of wise water practices (by education/advertising and law enforcement) to all Albertans (both business and private homes). Make available alternative water conservation practices by encouraging things like grey water systems, xeroscaping, healthy business practices and the like through education, tax incentives, etc.
- Long range supply.
- The healthy sustainable ecosystem should include those who use the rivers, streams, lakes, wetlands, etc. This would include wildlife such as elk, deer, cougars, bears, etc.
- All of the above plus consideration of protecting downstream supplies including our neighbouring provinces and Montana.
- Agree with above but would add: users should pay for their required water. This should include post-use cleaning. Those who use the bulk of the water should bear the brunt of the cost for 'using' it.

- Remove "reliable, quality water supplies for sustainable economy." Change to "reduce consumption (mostly industrial and agricultural) of water supplies for a sustainable economy."
- I would change "reliable quality water supplies for a sustainable economy" to "Adjust economic activities to support healthy sustainable ecosystems and a safe and secure drinking water supply."
- Sustainable life, sustainable economy (existing growth is not sustainable).
- To ensure that Alberta (and Albertans) are very efficient users of water.
- Fair and equitable water distribution/management strategy - to maximize public good while maintaining individual rights to business and life.
- I would add the active funding of innovative water technologies.
- Objectives not complete - education to water consumption is essential. Over consumption in Alberta is a shame compared to countries were people die because of no access to water or bad water.
- Planning based on scientific fact not political fancy.
- Water conservation will be the first priority.
- Make sure anything we do is actually sustainable.
- It is absurd to suggest all water used in the province should be brought up to safe drinking water quality. New residential developments should be required to have a two-line water system; one line potable and one line for other use. This could assure higher quality potable water at the same cost as a one line system of compromised quality.
- Water for human consumption (very important).
- With the pollution problem in the world, will the water ever be safe to drink due to the acid rain?
- Only that we need to be careful to not leave the impression that we can always have more of everything all of the time. We do need to be prepared to make informed "trade-offs" in order to achieve an appropriate balance of outcomes from water management and water use.
- How do bullets 2, 3 or 4 effect bullet 1 (or vice versa)? There is probably not enough water for everyone to have more water for every purpose.
- Communities need to take a more active role in sustaining water supplies in their watersheds.
- Water management on a basin level has to be improved. The provincial cuts to personnel in water resources over the last 20 years has depleted the availability of good water planners.
- Reliable means being able to effectively "live within our means" when natural water supply limits have been reached. Not to say that harnessing water is wrong but that a balanced approach is required. Major interventions are too disruptive ecologically.
- I suspect government means sustainable economic growth, which in this province, ignores ecosystem needs. Even with scientific knowledge, Alberta Environment and Agriculture continue down a path of CFO expansion, oil and gas drilling and reduction of water quality/quantity. And again, Lorne Taylor will find a way to divert water from northern Alberta to southern Alberta and to the states.
- Unfortunately, not all view "sustainability" in the same way. Thus these principles might have quite different results depending on their application.
- Add: Knowledge and systems development that effectively encourage/require efficient water use.
- Agree, but sustainable ecosystems are more important. Will ensure sustainability in all areas including the economy.
- Does not specify who has priority, health of ecosystems or sustainable economy.
- Having safe and secure water should not be or depend on a viable economy.
- Education, awareness and incentives for water conservation strategies must be given first priority.
- Add - responsibility to sustain eco-systems beyond our borders - Arctic.
- Water is one important factor that limits our growth in population and activities. We must research these limits and be guided by that research. It is not good enough for politicians to say we will triple this or that industry or activity.
- Sustainable economy is a loaded term. This does not equate to sustained growth.
- Each level of user should pay the same rate.
- It seems unlikely the government will start listening to experts any time soon. So far they always seem to pay for the reports and then ignore them in favour of golfing buddies and places on boards of directors when they finally, please god, leave government.

- Number 3 suggest that a sustainable economy is understood or defined. Replace with reliable, clean water supplies for positive humanitarian purposes.
- Deal with water resource issues first on a watershed basis. Never as a broad province wide assessment. How can you compare issues in the Peace River watershed with issues in the South Saskatchewan watershed?
- Drinking water is not a gross level management it is for the municipal or public health regulation end as long as reliable, sustainable water supplies are there.
- There is always a danger that peoples livelihood is compromised as we tilt the decisions in favour of the environment over the needs of people.
- These sound good, and are in the proper order. Now, let's follow them. I note the word 'sustainable', not 'growth' and support it's use.
- Look at the logging we are doing, talk to any pioneer – they will tell you why our weather is dry – taking too many trees!
- Agree - providing "a safe, secure drinking water supply" is the number one priority.
- Forget the sustainable economy or increasing economy. We have enough economic growth.
- Please remember to include all life in the ecosystem not just human beings.
- I disagree with the water supplies for the economy. What about our environment? Wasn't it last year Calgary denied horticulturalists water while car washes were still running? How about more programs for those who live in towns and cities to understand how valuable water really is?
- Have all old and new seismic holes filled right to the bottom.
- We need to analyze how big business obtains/uses and pays for it's water. It is not enough for us to give it away in the interest of boosting the economy.
- Economic considerations should not be considered - the protection of the water is the only priority.
- Add 1: that big "factory farms" not be allowed to abuse the water sources, the environment, to the detriment of Albertans. Limit oil wells and/or find alternate to tampering with aquifers and use of municipal water reserves and/or lakes.
- Implementation of best management practices for land use to ensure ample clean water for the benefit of all. Implementation of water conservation measures to ensure water is used wisely.
- The government must turn from its short-term "dam it, damn it" mentality. Retaining water is only a short-term fix to what is ultimately a long-term issue. Dams are destructive, unaffordable and dangerous. They do little to control flooding, submerge important habitats, drive people from their homes and significantly alter the aquatic ecosystems. Water does not need management. Those who use the water do.
- Growth must be encouraged but managed carefully
- I would say rather "Healthy ecosystems" - it's a clearer statement of purpose. I would eliminate reference to the economy because I believe that by having a healthy ecosystem, it will dictate the level of economic use that is truly sustainable.
- Sound objectives if they are administered by a competent water authority instead of individual water users or co-ops.
- Define what safe drinking water is (drinking, oral hygienic, food prep). Add a safe, secure non-potable water supply (toilets, showers etc.).
- Most water in Alberta is no longer safe to drink without treatment.
- Had to say no to the first statement as we don't know for sure what part of the ecosystem is absolutely necessary.
- Access to domestic water, no matter where you live in the province.
- There must be a recognition of the rights of water users with existing licenses as a background to the entire process.
- More emphasis on industry and the economy. Less on ecosystems and drinking water.
- This government must change it's priorities to satisfy the majority of Albertans, not the monied interests.
- Not in the right order.
- Agree with points 1, 2 and 4. Point 3 is relevant but would be better stated as "an economy which is adapted to the availability and sustainability of water." Water is absolutely fundamental to everything - its protection must rate far above economic interests.

- More emphasis on #3 - the economy and since irrigation is the major user, list it as a part of that economy.
- I would add to #2 'for all Albertans.'
- Who decides what is healthy and sustainable?
- Protection from outside government forces.
- Put more emphasis on on-river storage (i.e. dams to ensure the capture of spring runoffs that can be utilized and released downstream during the summer.
- I would like to see some security built in that ensures continued use of current infrastructure.
- I would add quantity which is associated with reliable.
- I would also add "Investigation into levels at which growth cannot be sustained and aquatic systems must be protected."
- More strategically located water shortage facilities to allow for more access to water from high river flow years in years of lower river flow. In other words, an inventory of water from years of excess flow for years of below normal precipitation.
- In addition we must store an abundance of water for strategies to function.
- Adequate funding is needed to assist infrastructure development.
- I like these. Emphasis on the healthy, sustainable ecosystems including all inhabitants, human and non-human. Potentially destructive industrial practices must take a lower priority.
- Why are these questions so focused already? It seems that decisions have already been made and this call for "input" is nothing more than an extremely biased method of collecting the "support" needed.
- Urban and rural concerns must be given equal weight.

did not indicate location

- Greed by any group can destroy what has been a proud part of Alberta's heritage. Let us carefully consider where change is necessary. Let us leave our province strong and free.
- Healthy ecosystems should be at the end of the list.
- Underpinning the strategy must be a strong economy or we will not be able to sustain a healthy resource.
- A sustainable economy is probably counter productive if economic demand s(growth demands) continue too heavily for scarce water resources.
- Some decisions must be made for the good of the environment etc. and not based on how much money can be made.
- These should be in the order they are in for priority. Everything depends on a healthy environment.
- Define "sustainable economy" and perhaps we could better answer the question. It depends on how and who determines the phrase.
- We supposedly have had this already.
- Sustainable economy does not equal sustainable development. Limits must be set on how much development can occur.
- Non-economic use (non revenue generating) use (i.e. lawns) are of lesser importance.
- Reality is outside influences (act of god) demands may fluctuate in different parts of Alberta. No cookie cutter solution will work across the province. When is too much government interference? Before controls are in place more information on what we have is needed (scientific).
- Although one must recognize that a sustainable economy is not one that is undergoing sustainable growth.
- We have seen so many streams and lakes that have deteriorated so much in the last 100 years - with more heading down.
- Management of grey water, wastewater, salt water and recycled water is crucial component. Less contamination and less license to pollute.
- I am concerned about the definition of "sustainable economy." Will a sustainable environment be compromised to permit economic development as has been evident in the past. Some industries are misusing/overusing/abusing our water supply. (e.g. agriculture currently uses 70% of surface water using outdated irrigation processes).

- I assume "quantity" is recognized as an issue and a challenge.
- But water is not the only issue we need to address. Uplands (range of forest), land use, maintaining some natural vegetation on our landscapes.
- You should add First Nation concerns and not leave them out.
- Total approach to supply energy. Work on new systems. Stop despoiling family farms. Respect wild life.
- Common horse sense.
- The knowledge, assertiveness and proactive approach necessary to make effective water management decisions.
- These are good objectives, but they should not be overridden by special economic interest groups.
- Healthy sustainable ecosystems should be the priority in the strategy. The underlying assumption made by the government is that economic objectives take priority over all of these. This is wrong.
- The oil patch is the number one big concern nowadays.
- Conservation and "best practices" for use is the most important objective.
- I agree with a sustainable economy, but we cannot sacrifice other objectives for economic growth. We are a wealthy province.
- Add province-wide conservation strategy.
- What is the definition of sustainable economy?
- The guiding objectives are on the right track.
- Natural water users, wildlife, fish, birds.
- More conservation, less pollution.
- As long as building more dams isn't part of the plan, let's clean up and conserve what we have. Tune in the oil and gas industry before it is too late.
- Environment preservation in Alberta to ensure a healthy overall ecology.
- Take out a sustainable economy and replace with healthy ecosystem of future generations add to public input.
- If past practices continue, the above objectives won't matter. Past practices must be identified first!
- Only "reliable, quality water supplies for a sustainable economy," which is very general, is what truly counts. The others are repeats.
- Down stream implication of flow must be addressed.
- Change the wishy-washy word "quality" to "high-quality."
- Conservation of existing water supplies.
- Private property rights don't seem to be considered here. Riparian rights must be protected too.
- Believe we need to look at this and have a few more objectives, as they look quite broad.
- The third and fourth items above should be deleted. The first two are the only ones that matter.
- #3 should not be as much of a priority as the other objectives.
- We agree with objectives 1, 2 and 4.

achieving safe secure drinking water

Private Water Systems

5. Do you get your water from your own private system.

A number of respondents chose to comment on question 5.

north of Red Deer

- We haul all our drinking water and cooking water from town as well as the water for livestock in the winter.
- At my second lodging – lake property.
- While living on the Athabasca Chipewyan First Nation Reserve, members do use rainwater, melting snow and the Athabasca River. Our water system hasn't been treated whatsoever.

did not indicate location

- Water created by God. Belongs to his children not to be misused.

6. Because private systems fall outside Alberta Environment's approval process, the safety of private water supplies cannot be guaranteed. Currently, the property owner is responsible for ensuring his or her own water quality and quantity. Considering this, please review the options below. For each option, indicate who you feel should be responsible for it.

Respondents commented on options presented in question 6 and also provided their own examples.

a. Monitor the quality and safety of the water supply for private water systems.

north of Red Deer

- Whichever body requests the tests should pay.
- Supply one free test for private residents every second year. *Shared*
- Analysis. *Provincial Government*
- Collect and deliver by property owner. *Owner*
- It is a health issue, cost could be shared.

Red Deer and south

- Owner must see it is done, but government must provide means of doing it.
- Province needs to be aware of changes to water quality.
- 1 sample every 1 or 2 years or more if sample nears "unsafe" point. *Provincial Government*
- Structure and technology available via province, but cost of testing by owner.
- Would be nice to have access to public testing system for a flat fee.
- Property owners have no avenue for enforcement - data sharing.
- Specified frequency of provincially paid test. Additional at person's expense.
- Route river water into smaller watershed systems - e.g. Berry Creek/Sounding Creek water supply project. *Provincial Government*

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences.

north of Red Deer

- Only given certain financial constraints such as a minimum depth to an aquifer. (Shared)
- Too many variables to consider. People choose to live in rural settings but consider distance to all concerned to supply untreated water. What if someone dies from untreated water - who takes that responsibility?
- Restrict rural development where water is limited. *Owner*
- Should be considered as basis of population density.

Red Deer and south

- Don't do it.
- Obviously the costs can be overwhelming for just a few people and too much for budgets to realistically bear. *Shared*
- Within reason – water might be sent to some sort of storage mechanism centrally located to a group of users.
- This idea is not feasible. Municipality should be responsible along with Province and property owner.
- Not before a lot of study to determine safety of this.
- Let's consider not developing more and more subdivisions in rural areas.

did not indicate location

- Untreated – why would we want untreated water piped in? Might as well dig a well.

c. Develop individual water supplies (e.g. well drilling, dugout construction, water hauling).

north of Red Deer

- This depends on the reason natural water is not available. Has it been contaminated with oil from drilling? If so, not the owner's responsibility. Contamination due to factory or farming? It is the owner's problem but Province must monitor neighbours. *Shared*
- People choose where they live.

Red Deer and south

- Lack of water is reflected in low land cost.
- Strongly feel it is the property owner's responsibility for supplying and/or developing private water systems. The onus has to be placed on individuals when they are considering any type of development.

did not indicate location

- Clean water wells should be the only way government should help. *Shared*

d. Pump water from distant sources to dugouts during times of drought.

north of Red Deer

- Depends on who caused or what caused the drought or shortages.
- Short-term solution - look for solving the problem.
- Pumping water from distance sources should be done only in an emergency. *Property Owner*
- Province should present ? and not pay for.
- People need to plan for such risks, but government should be able to provide some assistance.

Red Deer and south

- Pump water with provincial permit to ensure enough is left at source for natural habitat. *Provincial Government*
- This is making the assumption that it is a viable solution . . . are water supplies sufficient to make this dugout valid?? Is a dug out efficient?
- Should only be allowed if source can handle it. Elkwater Lake is being drained.
- To encourage self-reliance. *Owner*
- Maybe consider not using such areas when extreme drought occurs. Such dry conditions would also result in overgrazing of available grass.

did not indicate location

- If farmer requires that water for livelihood (NOT for watering a big lawn).

Add your own example...

north of Red Deer

- It should be mandatory for a property owner to have storage for a year.
- Obtain year supply in springtime snow melt.
- Why should taxpayers pay or subsidize private or small crop water system?
- Provide information to the public on how to develop an adequate and safe private water system. Could reduce pumping needs during drought, and provide safer drinking water for owners.
- Tie rural water users into regional (municipal) treatment and distribution systems where practical. Safe and adequate water for more people.
- Businesses using private systems - what monitoring needed?
- Studying and providing results of the studies on Alberta's aquifers and other clean water supplies both for availability and cleanliness.
- Our municipal and provincial taxes should already cover this.
- Construction of large municipal dugouts - whereby local people can hook into and share the cost for water analysis and up keep.
- I believe water expense should be shared.
- Sewer systems should be part of water considerations.
- Develop pipelines for the supply of treated water from municipal systems to rural residences. (Shared Responsibility)
- Assist industry and agriculture with developing safe water use strategies to prevent contamination and long-term drought policies.
- Except when there is a feedlot above us, and we have asked government for help for years with no success.
- Are the groundwater quality issues being addressed.
- Water supply systems to communities could be a cost sharing project between the community and the government.
- Technical support, dugout information (adequate size, etc.). Example: well drilling, water too hard (smells), ways to clean up the water, passing knowledge on to those in need. (Shared)
- Monitoring pollution and water use; enforcement actions when necessary (both on public and private land).
- Develop and approve programs for pipelines and regional water supply systems (water co-ops) to deliver a treated water supply (i.e. municipal water)to individual rural residences where a well of sufficient water quantity and quality is not available.
- If an individual builds on land without utilities who's responsible for such provisions?
- Surface and groundwater contamination.
- Regional water plans. Rural water resources not well understood.

- Limit population growth. More people =more water problems. No more industrial excesses. Provincial incentives could help expedite these changes. Use grey water recycling for lawns and toilets. Don't treat any but water for drinking, etc., to human consumption standards.
- Take water conservation measures, have low flow showers, low flush toilets, nor irrigation of high water crops, better irrigation technology, etc.
- We all contribute to the contamination of our water supply.
- Some development has already occurred in areas where water used to be taken from.
- Any user should bear its own costs of development and supply. *Owner*
- Make the ID users pay for the water and the infrastructure. *Owner*
- People have to learn responsibility.
- Individuals really have no impact on government decisions so the province has to be responsible for the individual benefit of all.
- Potable water should be tested once a year.
- A grant should be supplied to upgrade private water systems.
- It is necessary that people locate themselves where livelihood is sustainable. If they choose not to, the general public is not responsible.
- Approval of water diversion.
- Pay your own way and not depend on public funds. *Owner*
- Industrial-type uses of groundwater can result in contamination that would otherwise not occur. This contamination would result in the need of water treatment facilities for the resident, or a means of obtaining sufficient water.
- Quantity of groundwater needs to be studied. Currently there is not a lot of knowledge of the groundwater resource. We need to know how much water is underground so that we can plan for the future.
- If private water systems want to get on city water, the town itself should pay (through taxes) to pay for ones in a sweep of x number of kilometres.
- Government must accept responsibility to provide good water for landowners since they did not enforce regulations to prevent surface water entering the water aquifer and prevent the movement of water from one aquifer to another in the exploration.
- Monitor the quality and safety of the water supply for private water systems at a higher threshold. Water is presently analyzed for coliforms and mineral content. It should be analyzed for farm chemicals also.
- Sample per 5 years paid by government. Protects children, more often if groundwater is disturbed by government or industry approved by government. Also, as in the latter, government responsibility to return or set a system equivalent to what was in place.
- What about drinking water that is purchased (5 gallon jugs etc.)?
- Ensure rural groundwater and local surface water supplies are maintained by wise land use planning that protect recharge watersheds, wetlands, lakes, river from destruction.
- Ensure rural groundwater and local surface water is maintained with planning that protects recharge watersheds, wetlands, lakes and rivers.
- If this means that AE has no means of limiting the number of drilled wells and the use of that groundwater then we can expect the groundwater in some areas to be over-used and run out because of existing and/or more users in those areas. What can AE do to put limits on withdrawals so that existing aquifers are not overdrawn?
- Needs of fish and wildlife and forests must be considered.
- Land users must carry out environmentally friendly practices. The government would provide leadership in this area by working with communities and industry to develop the required awareness, education, tools, regulations and enforcement.
- Sure is nice to have a little help with pumping fees when the drought is on and income is down.
- Government should ensure that no one contaminates another persons water supply. Once this happens it may be irreversible.
- Monitor the quality and quantity of the water supply for private water systems in areas of high industrial or agricultural use.

- Government must be responsible to make sure other water users do not contaminate water (industry).
- *In areas where there is no groundwater, or is poor groundwater* (i.e. salt water in areas). Land owners (Peace River Farms) have to construct dugouts especially for house hold water.
- If the Provincial Government hadn't been so damned big hearted with industry (oil/gas especially) we wouldn't have this problem. We humans have created this problem.
- Keep all water wells to low volume use for human consumption only.
- Ensure that other interests do not pollute what is already there (i.e. energy sector, water injection).
- Tap off from the main line metered. *Owner*
- Main feeder line. *Provincial Government*
- Initial capital cost of retrofitting existing irrigation, residential and industrial facilities and uses.
- Indians living on reserves all have water cisterns.
- If there is not enough water for a farmer to irrigate, the government should subsidize or allow tax breaks to use the land in an alternate way. Such as leaving the land for 2-4 years for endangered animals such as burrowing owls.
- Safe water is a health issue. If we make it solely a private matter (i.e have no government standards) then our health care system bears the burden of the sickness that may result. Rural residents should not be at greater risk just because of their location.
- Ensure rural groundwater and local surface water supplies are maintained by wise land use planning protecting/recharging watersheds, wetlands, lakes and rivers from destruction.
- Province buys the equipment and rents to interested parties.
- If forced to use co-op systems. *Provincial Government.*
- Pipeline system is a non-starter; too expensive both initially and for maintenance.
- The federal government should also share responsibility/costs, as well as municipal (rural taxes paid to both).
- We have drilled 4 wells so far and do not have an ample supply the last few years because of tampering upstream and excessive draw downs on water by industry and drought. Because no provincial funding is available to offset costs of new wells, we have dugouts, wells and creek, but not sufficient water supply and miles to pipe in. We haul at our costs. Yet our government can afford to give raises to everyone but farmers so we have to sell down to make ends meet. *Provincial Government*
- Maintaining integrity of systems and properly sealing abandoned systems.
- Reward water conservation strategies.
- Develop regional water treatment systems to supply treated water.
- Pipeline infrastructure would be maintained by removing solids (prevent erosion) and disinfection (prevent corrosion and loss of hydraulic capacity). Incremental costs of treating water to potable standards is small. Greater costs are involved in maintaining distribution systems. Supplying raw untreated water to households may put supplies under litigation from providing a dangerous product.
- Provide technical assistance and product testing for home water treatment devices.
- Develop technology to ensure safe, potable water from less than ideal rural sources.
- Assist with site specific assessments of water treatability and identification of best available technology (e.g. pilot studies).
- Focus on developing technology to make use of local sources, as much as possible.
- Improperly abandoned wells pose a great risk to contamination of groundwater supplies.
- Government to provide comment and evaluation of water testing to municipalities. *Provincial Government.*
- Ensure groundwater and surface water are maintained with land uses that preserve watersheds, wetlands, lakes, rivers.
- In rural areas - proper handling of sewer and like must be monitored by government to keep the drinking water safe e.g. mounds are approximately 60% ineffective and pumpouts are still allowed into ditches.
- Water metering to determine the usage of private well systems.
- Municipalities should be encouraged to provide regional water supply (as per Edmonton).
- Industry to cover some of the cost of water systems if their industry(s) are a risk to that water supply.

- High cost could be balanced by tax incentives or assistance programs to get people on clean water.
- Planting natural grasses, raising buffalo, not beef.
- Why is there no municipal responsibility?
- Monitoring stations like health limits must be there.
- In times of drought, stop industrial/agricultural use of small town water supplies. Industry uses water to pump down wells. Farmers use water to feed cattle and spray on fields – why should I run out of water in town for this?
- Maintain a database which will allow individuals to make an informed decision as to the suitability (quality, quantity) of a water source.
- Regulate surface and subsurface activities which may jeopardize water quantity or quality.
- Reasonable fees/charges for regular water testing by provincial laboratories especially since industrial development, municipalities nuisance grounds etc. do eventually contaminate underground aquifers (wells).
- Government regulated decentralized water testing facilities, close to home, regional versus one government lab. Are there any "depots" handy for quick checks? or do people buy their own water distillers because centralized labs are too expensive, take too long?
- Large pumping operations will require notification to adjacent landowners. (Shared)
- Political implications. *Shared*
- Encourage development in the north where most of Alberta water is. *Shared*
- Protect water quality of source.
- Our taxes support urban water supply. All Albertans should have the same right of access to clean water, including rural residents.
- Oil and gas companies should be responsible for paying for the quantity of water they are using.
- Private water system users should maintain and manage their own supply assuming we are not taxed or charged for our water. *Owner*
- Oil/gas companies should also be involved in this shared cost, not just the taxpayer and the property owner as these companies can pollute a neighbouring property owner's well, etc.
- Produce legislation for building and maintaining private water systems. Private sector should follow standards set by government bodies. *All Responsible*
- This will hopefully prevent any potential burden on health care costs attributable to unsafe water.
- Proper abandonment of old wells.
- Polluted water is found throughout Alberta. Industry only has to police itself.
- Majority of capital cost should be to users. All operating costs should be to the users. *Property Owner*
- If people have been allowed to move into a drought area they will have to relocate.
- Monitor the quality and safety of water used on commercial activities.
- Provide expertise to the private water well owner to find sources of bacteriological and other contamination.
- Have municipalities extend pipelines to supply treated water to hamlets, etc.
- Restrict housing developments where water is not available or on flood plains. *Provincial Government*
- Ensure conservation of surface and groundwater supplies for aquatic ecosystem and domestic supplies. *Provincial Government*
- Provincial government allocates underground zones for oil and gas exploration and should be partly responsible for any implications.
- We get our well water tested yearly, but there is oil drilling nearby and we can detect a difference in taste. Also there is a large cattle farm uphill and in times of heavy runoff, manure has been carried to the ditches and into the lake. We feel the Province should be monitoring this activity on a regular basis by sampling groundwater at various locations (not every well).
- Stringent regulations for industries that have the potential to contaminate groundwater should be enforced. *Provincial Government*
- Ensure promoting efficient water use on agricultural lands and smaller areas. Irrigation rehabilitation costs millions. *Shared*

- Cost of inspector wages and development of standards as well as enforcement of standards.
- Set up and enforcement of water supply and discharge systems.
- Set up of an Alberta Government agency to monitor all rural water supply and discharge systems to public and business.
- Places like Fort Saskatchewan are probably not 'suffering' yet. Government is responsible for enforcing environmental controls.
- Monitor surface and groundwater near intensive livestock operations.
- Sampling costs about $400 per well, lab costs about $150 per sample. Professional evaluation of data is significant.
- Encouraging water catchment systems (e.g. rainwater) in cisterns. *Owner*
- Develop more water treatment sites e.g. Keephills, Tomahawk or North Saskatchewan River.
- Very expensive to fix and in the thousands I suspect. *Provincial Government*
- Do not pipe, divert or transfer water from northern rivers and lakes to the south.
- Review private owner's or co-op's quality management plan for maintaining quality of water.
- Establish QMP template for private owners to use.
- Rural, urban, and industrial areas should be encouraged to manage precipitation (i.e. rain barrels to water gardens and grasses). Industries are using too much treated and consumable water just to run through a boiler.
- Filling natural watersheds and ecosystems to increase yields.
- Water licences for industry/agricultural activities may need to be de-prioritized.
- I am not sure of the cost, but modeling our growth after natural bio-regions is another option.
- Private water use requires proper regulation re safety and preservation of groundwater supply. However, access to water is largely responsibility of landowner. An urban user pays for processing and delivery monthly, rural user costs tend to be capital in nature, but amortize over time at a similar cost to the urban user cost.
- Control of industrial use of water. Licenses should only apply when there is ample water, should be suspended during drought.
- Pay the full cost of diversion, use and treatment of water for personal and/or industrial use.
- Government could help pay costs of testing for quality and pumping water to drought areas for those farmers who are in an economically vulnerable position of losing their farms providing the situation can be considered short term.
- Fragmentation of land ownership will be expensive to correct as land use issues intensify.
- Charge for the use of water instead of just for its treatment and supply implications: individuals and businesses benefit from it and by not paying for its full costs, they use it in excess. Full costs of water should include treatment, transportation, associated infrastructure, and environmental costs. Charging for water would motivate individuals and businesses to find innovative ways to conserve water.
- The money needed to fund this should come from taxes or fines imposed by the government on industry, rather than taxpayers.
- Collect rainwater/snow. *Owner*
- Educate property owners on water conservation. *Shared*
- Ensuring water tables, streams and groundwater do not become contaminated due to mismanagement (harming private systems).
- Sale of water. NAFTA/ U.S. pressure for "'sharing" resources.
- Monitor pollution/guidelines. Upstream/downstream issues. Why pay to pollute – fines?
- Policy and legislation to prevent groundwater contamination from agricultural chemicals and effluent to ensure you get clean water from wells.
- Since the province owns the water resources it should be primarily their responsibility to see that all residents of the province have an adequate and safe supply.
- If a person chooses to live in an area that naturally does not receive as great amount of water they shouldn't expect help from anybody to pump more water to their location. We have to learn to live within some of the natural framework that exists.
- Make sure results of water testing are made available to public.

- Protect groundwater and surface water supplies (above questions refer to monitoring only). What goes into waste disposal, better storage.
- Responsibility for ensuring uncontaminated groundwater supplies through legislation and enforcement. - Provincial Government.
- Responsibility for ensuring uncontaminated groundwater supply. Industry causing contamination.
- Clean up of contamination of water supply due to industrial waste.
- Provide standards for citing of wells, maintenance and water quality.
- Provide treatment of raw water.
- All private recreation property water sources.
- Stop the operation at this location don't exploit resources here.
- Set standards for domestic water and educate property owners on water safety and quality.
- Develop and/or adapt water safety and quality technologies for use in Alberta's rural communities.
- Where do municipalities take responsibility for cost, safe [water]?. They collect tax for all utilities.
- Government must set very high standards for water and water safety and enforce it.
- Costs will be periodic, and may only be needed once or twice yearly. However, when costs are necessary, they will probably be relatively high.
- We see the government role to ensure the health of the community. Therefore, water on private property that is shared with the public or has impact on the public should be the responsibility of the provincial government. For example, it is the responsibility of the property owner to obtain water for testing and to transport it to a provincial laboratory. However, it is the responsibility of the province to test the water and provide feedback in a timely manner.
- In the section about Private Water Systems, you should have included "municipality" as a choice for having responsibilities. The municipality may have the expertise through their public water supply system to extend some of these services to individuals on private systems.
- Insist rivers; streams, lakes and all natural water sources are fenced. *Shared*
- Government monitoring of agricultural and industrial wastes with the potential to leach or runoff into ground or surface water supplies. If landowners are completely responsible for water quality, they are penalized if a CFO or a pulp mill or another nearby source of contaminants pollutes their local water supply. The government of Alberta is really responsible for all water in Alberta.
- Irrigation farmers should be required to pay more for water.
- Development outside of city boundaries contributes to urban sprawl which is a burden. Costs should be paid by developers. *Property Owner*
- Develop water conservation systems and recycling mechanisms. (Shared)
- Costs could be held at a minimum and cost shared by the individual municipal districts and government: federal and provincial.
- Most small farms or family farms are quite responsible. They adopt their agricultural practices based on type of soil and average rainfall in area (i.e. don't grow wheat but alternate crops that require less rainfall. Size of mega farms such as feedlots and pig farms should be limited as the concentration of thousands of these animals requires mega amounts of water to sustain them requiring piping or diverting water supply which drains watersheds etc. causing environmental disasters.
- Conservation of water is being done through different techniques in private water systems. Incentives to keep it going, upkeep, and circulation of knowledge about how it works.
- Improved monitoring and potentially reduced cost to government of water quality monitoring. (Shared)
- Develop a system of accrediting private water systems - could be similar to building codes.
- Towns and Cities are thinking of contracting work out to private companies. However it is unclear who should set the standards for water quality and rates to be paid.
- Industry should bear the full cost of use of our water resources and pay and maintain pristine conditions. The before and after picture of having industry move into an area should not cause concern. Environmental concerns must be paid attention to e.g. chemicals dumping.
- Supply pollution devices such as RO or UV. Minimize water quality problems.
- Pass laws to prohibit setting up any industry that would cause surface or groundwater pollution. - Provincial Government.

- Required to see the big picture. Substantial cost but potential problem avoidance.
- When people buy a farm or an acreage, they need a way to confirm that there is a safe water supply and the system is in good shape because it is so expensive to replace it - just as a building inspector's report is a requirement for sale of urban dwellings. Should include: inspection of the well and well casing, water samples, review of pump and treatment equipment status, any contamination potential issues.
- Some examples of cooperative watershed and aquifer monitoring programs now exist in Alberta. Individuals provide field monitoring and the government agencies provide monitoring equipment, analytical services, data management and reporting.
- Use constructed wetlands to treat wastewater so water can be reused.
- Monitor wastewater quality output from private systems. Lagoons and sceptic fields can contaminate water supply of neighbours.
- Develop individual wastewater collection and treatment systems.
- Agricultural runoff is one of the great unregulated polluters of surface waters.
- Government should require testing once a year to demonstrate potable quality.
- Rain barrel (local catchment) private urban residential lot.
- At a government level monitoring data is tracked and notable changes are checked and acted upon.
- Ensure information is available to educate and advise on issues related to water quality and responsibilities for water quality testing.
- Safe groundwater supplies. Watershed protection management.
- Landowner should be available to any financial benefits as municipal systems, if any given.
- Government responsible for general water table purity, landowner responsible for drilling own well.
- A well costs $5,000 to $15,000. A dugout costs $3,000 to $5,000.
- All projects should be user pay - after all, government is my money.
- Help to build dugouts.
- Ensure groundwater remains uncontaminated.

Red Deer and south

- Rural subdivisions of high density. The municipal government that approved the subdivision and developers have to be prepared for the water problems they help create.
- Developers of new subdivisions should post a significant bond prior to development in case there are groundwater problems in the future.
- Mandatory testing should be in place. Impossible to supply each individual if they are in isolated areas of their own choosing the testing and acquiring of water should be the responsibility of the individual. All water should have mandatory testing and safety measures in place for wells, dugouts etc. This was necessary in the depression. Ours came in the train water cars. Measures to conserve water should be available to all.
- Educate rural people in private water supply, water quality issues, water development, etc. *Provincial Government.*
- All water distribution systems should be government controlled.
- Some municipalities will not charge water users for true cost of constructing/operating their water system.
- Move people to the water; not water to the people. Less infrastructure cost and less impact on aquatic environment. *Shared*
- Some financial assistance from the province might be made available. There needs to be a government check to ensure the use of the water is not abused (e.g. a licensing procedure). *Municipal*
- Oil well floods using fresh water is a grave threat to rural and small town water supplies.
- While not a government responsibility the government should encourage efficient water use any way it can.
- As your booklet points out "CONSERVATION/EFFICIENCY" WILL reduce household water use by 50%. I would think that cattle/animal watering systems that conserve H20 are also available (i.e. cattie wallowing in sloughs, dugouts is inefficient and harmful).
- Governmental encouragement to test wells. Develop a less expensive analysis system.

- Aquifers are vital water sources for areas without reliable supplies of surface water. If groundwater becomes contaminated it can be prohibitively expensive to find alternate sources.
- Ensure that rural groundwater and local surface water supplies are maintained by wise land use planning to protect/recharge wetlands, watersheds, lakes and rivers, in the very best quality.
- It is unreasonable to subsidize agricultural or other operations which insist on flying in the face of mother nature either by building in flood plains or breaking land that should not be used for farming due to lack of natural water.
- This provides some control on over-pollution and allows for prioritization. Encourage treated co-op water systems where viable.
- Promote the collection – preservation of water on all building properties. Collecting, saving run-off for the private and public systems.
- Making better use of excess waters (e.g. flood waters). More collection ponds, wetlands (natural and man made) where eco-systems would be encouraged and protected.
- Develop educational programs to assist private water developments in monitoring/protecting their supply.
- Ensure rural groundwater and local surface water supplies are maintained by wise land use planning that protects recharge watersheds, wetlands, lakes and rivers from destruction. Responsibility of private landowners, province and municipal government.
- The Department of Health used to do water testing for free. We need to reinstate a Department of Health. *Provincial Government*
- If an area is too dry to farm and there is a significant cost in bringing water, who should determine if this land is available?
- If unreliable water supplies are known to be found, should that land not be developed? Who should control this?
- Oil/gas should be required to do groundwater testing and monitoring should they wish to come into your property or adjacent property. Aquifers must be identified prior to drilling or sand/gravel, extraction. Seismic holes are not reclaimed.
- Be careful that water doesn't become what happened with electrical, where all Albertans subsidize those that choose a rural lifestyle… unless this was part of a relocation of agriculture pursuits away from high demand irrigation systems then I would support more government involvement.
- Monitor and control the number of wells on an aquifer. – Provincial government.
- Monitor water supplies. If there is a problem find out who is creating the problem and it is up to them to fix it/be fined.
- Water coops - government and developer.
- If the water is polluted or disrupted/altered by an outside source, the onus shifts to the violator. This means an industry must prove it is not responsible by paying for the testing. The onus should not be on the private operator to prove the industrial (or government) source is the violator.
- Other than in municipalities, the landowner should pay.
- Ensure private sewage disposal systems treat sewage effectively.
- Increase use of water holding tanks to reduce loss by seepage and evaporation. (Property owner)
- Develop alternate means to traditional water uses: toilets, low water use appliances. (Provincial Government)
- Develop water recycling or purification methods for rural properties (distillation). (Provincial Government)
- Develop training for individuals for the operation of private water systems.
- Local monitoring should make sure that no one does anything that could harm the surface and groundwater resource for that or adjacent areas.
- People should be advised that their use of their land have to be consistent with the long-term availability of water supply unless they pay the full cost of bringing in a larger amount.
- Bylaws required to limit residents from watering gardens on certain days.
- The taxpayers of Alberta cannot afford to incur costs that are out of line with what would be reasonable to supply water to people who live in arid areas of some distance from potable water. I have some concerns in answering with responses supplied. For example, the first question above depends on the activities

adjacent to the private water systems. We seem to have a number of possible examples where oil and gas activity has potentially contaminated private water systems and yet the property owner and the private water system is left holding the responsibility for costs.

- Private, public partnerships for small communities.
- Low water treatment processes that create zero to low wastewater when cleaning.
- Develop the best plan to create the best drinking water solution for the resident (according to Canadian Water Quality Association).
- Access to existing water and sewer lines in rural areas between urban centres for rural businesses and residences.
- Regional water and sewer systems next to large urban centres like Calgary.
- Ensuring private water systems do not adversely affect quality of source.
- Ensure growth happens in logical areas and at appropriate densities.
- Large companies and corporations that pollute rural areas need to take full responsibility for cleanup from start to finish, not just when it is off their property.
- Share (municipal/provincial/individual) monitoring and transport of water.
- Many people purchase a rural property without any idea how to look after it, thus putting themselves and other people in danger.
- Responsibility to regulate pumping of water to ensure no cross contamination of watersheds (i.e. pollution, ecological changes).
- Need consistent high standards to all cities and counties. Regulate individuals. Need for more flexible - equivalent standards.
- Private water well standards and maintenance could be a source of contamination.
- Provide legal enforcement (with teeth) of anti-pollution laws.
- Providing technical assistance education etc.
- Providing guidelines and definitions of "safe" water.
- Limit the number of subdivisions built on rural land.
- HOWEVER, IT IS Alberta Government's responsibility to keep others from polluting otherwise clean water. If corporation oil injection, feed lots, municipal run-off is a suspected cause of pollution, property owners should not pay.
- Inter- basin transfer.
- Monitor installation of and approve rural septic systems which impact water quality.
- Industrial giants who use and abuse water should put back into the community by funding these issues.
- Groundwater studies.
- Groundwater monitoring (industry).
- Ensure drillers are certified and dugouts meet standards. Authorization of well building.
- Prosecute polluters responsible for contaminating well-water supplies. Implement fines that remediate the problem.
- Contour land to capture and infiltrate precipitation to reduce irrigation requirements. *Owner*
- Catch runoff from roofs for own use. *Owner*
- Aside from great monetary costs to build, this will also affect natural habitat for native wildlife.
- Regional groundwater should be monitored for baselines.
- Ensure the sustainability of groundwater systems for rural residents (quantity and quality). Groundwater systems are an integral part of surface water systems. Understanding the hydro geology/hydrology is not an exact science.
- Clean up, replacement of septic tank systems in rural settings. Sources of contamination for groundwater systems. Wastewater systems (i.e. septic tanks are in many instances aged and leaking). These contaminate groundwater supplies (affecting not only the individual residence but neighbours), options can be costly, replacement, central systems, new treatment technologies.
- Balanced economic choices. Enforce safe water practices. Are we allowing businesses to jeopardize our safe water by pollution or overuse?
- As a city dweller, I pay for the delivery and treatment of my water.

- Modify and/or replace existing irrigation systems, with systems that lose less to evaporation.
- Replace dugouts with cisterns so less water lost to evaporation and less likely to be contaminated by cattle.
- We have two private wells, one for livestock, one for the household. Water analysis is done every few years. *Shared*
- All wells drilled be done by a journeyman or qualified driller (legislation). *Provincial government.*
- Reclamation of old and new wells and boreholes be enforced.
- Many now use streams and lakes as their sewers.
- Size of livestock operations should be bounded by ecological constraints of region, not economic factors.
- Cost of installing a monitoring usage.
- Develop a system to trace and identify those that pollute groundwater sources.
- Large commercial agricultural operations (i.e. pigs/cattle) must develop water recycling goals/programs to minimize ground/surface water demands.
- There should be a set guide as to the distance between feedlots and water resources (and one to the other).
- The disposal of cattle manure should be reasonably regulated as to spring runoff etc. The use of water to work old oil fields should be stopped immediately. This is a total loss of valuable water.
- Stricter drinking water standards. Initial costs (treatment) versus long-term cost (i.e. hospitalization cost and law suits).
- Government could employ trained staff to assist/inspect private systems.
- Purification equipment. Costs range from $500 to $5,000 depending on water source.
- Management of resources is required for equity - so it is everyone's responsibility.
- Individuals with private wells/water systems, have to take responsibility for their water quality. It is the province's responsibility to ensure land practices and industries do not affect the quality of private water systems.
- I am a city dweller (lattes and manicures) but I recognize that developmental funding will help all Albertans prosper. In turn, I will prosper. I would like to see a shared funding/responsibility here.
- Quality of water affects us all - if rural farmers are watering land or animals, will result in poor quality of water. Our food is affected if it comes from the areas.
- Rural areas to put in new filtration systems for potable water a one time grant deal.
- Pump water from distant sources to upgrade standard of water for livestock and human consumption. Once pipeline is in place very little over-all costs will be experienced.
- Ensure there are enough reservoirs in place so groundwater can remain at a better level.
- Province wide education programs on water ecology and conservation.
- Make it mandatory that individual water supplies are monitored monthly to ensure quality of water for drinking. The landowner is responsible for collecting the sample once a month. (Shared: Property owner and Provincial Government). The quality of the water will be tested by a provincial lab and the costs will be paid by the government. These charges for testing will only be paid if the individual samples their water at least once a month, 12 times a year and does a particle count once a year.
- About financial issues? The province could underwrite bond issues to obtain lower interest rates. *Provincial Government*
- If additional licensing in an area reduces amount of water to meet household and registered users' requirements then government would be responsible for cost associated with water hauling, new wells, etc. If M.D.s allow further development in areas of low water, then developer is responsible for water on new parcels.
- Water is used from either the City or from a local river. Either way, water is lost from the system due to evaporation, leakage or other means.
- Take a lot of time and money to do wildlife survey.
- Monitor and police activities around wells/dugouts. *Provincial Government*
- Develop maps and monitor and regulate use of aquifer water. *Provincial Government*
- I feel in very dry areas we should jointly fund (provincial and private) drilling artesian wells.

- Access to laboratory testing for water sources.
- Providing knowledge and technical advice to owners education.
- Government approved private system that must be certified correct for installation and water quality and wastewater disposal before activation of use.
- Provide treatment systems to private (individual) water systems.
- Restrict livestock from access to riparian areas.
- Moratorium on oil and gas development in areas of low water quantity.
- Manure management of CFO.
- Advising rural people of the quality of water they are using. *Provincial Government*
- Monitoring of water quality. *Provincial Government*
- Prosecute and penalize people/industry found to be polluting private water supplies.
- People can live where the want. Other taxpayers should not subsidize their water supply. Therefore people should pay their own way without handouts.
- Develop new ways to preserve runoff and replenish groundwater when it rains or the snow melts. Cities, roads and de-certification of agricultural lands result in rapid runoff without water retention.
- Better cost effective and reliable water monitoring must be developed. Failure to ensure clean water will lead to a decline in food quality, increase in disease and rising health costs.
- Need for tax incentives to develop a reliable water source.
- Provincial government to be responsible to enforce safety of all water sources and protect against pollution particularly feed lots.
- Educate our citizens on water conservation.
- Ensure that for gain activities are not allowed to misuse water.
- Plan residential growth to avoid sprawl and fragmentation by country residences/acreages. Focus growth on existing cities/towns/villages. Municipal land use planning should consider costs of providing infrastructure for water delivery when faced with applications for country residential subdivisions.
- Actively protect all water sources from pollution.
- Enforce and prosecute those industries and individuals responsible for the contamination and pollution of private water systems.
- Investigate the source of contamination in private water systems.
- If they want to live in the country, this is the cost. If the activities of companies (e.g. drilling, dumping, pumping, cause problems, the companies should be 100% liable for any problems and should be absolutely held responsible for the entire tenure of the land owner and his/her family.
- All of the above options can/could/were cost shared programs federally/provincially. Assistance for rural users creates a monitoring service, as well as encouragement for rural users on safeguarding themselves.
- Define regulations where water resources are limiting reliable supply. Costs to provide water are high as is risk of poor quality or interruption.
- Equating private system owners about sources of domestic contamination and system reclamation.
- Protecting domestic water supplies from contamination and damage from outside sources (i.e. industry).
- I pay taxes to cover this function. If rural residents paid as much as urban dwellers, they might be surprised at the services they could afford.
- More monitoring of water well drillers.
- Develop rural regional water systems for treated water. Acreage owners should become part of a neighbouring municipal system or rural municipality system. Thus there would be less untreated water from private wells.
- Research and development of reverse osmosis, cistern and conservation systems for households and small holdings *Provincial Government*
- Modify crop, livestock, or commercial processes to accommodate annual fluctuations. *Owner*
- When drilling rigs drill wells within a close radius of rural properties and use huge volumes of drinking water (quality) everyday and they may in the same zones as local residences and then residents' wells go dry a year later – who's responsible to ensure the oil company pays to re-drill for residents? The government because they receive oil revenue from the oil company.

- Many people are not aware of the adverse effects of huge amounts or herbicides, pesticides and fertilizers in the environment.
- Should rural Alberta get a tax break?
- The amount of water used by a private well should be at the owner's discretion.
- No cost slight loss of land, large gain in water retention. *Provincial Government*
- Eliminate excessive erosion. *Provincial Government*
- Develop water sources on public lands leased to agricultural producers.
- Put resources into water quality at source (i.e. watershed).
- Water is tested when a well is drilled and between owners now. Information about recommended testing intervals or triggers that should indicate testing is needed should be available to property owners on private systems.
- Develop less expensive ways of checking for contaminants in drinking water, then sell the kits to property owners.
- They should test before and after seismic oil companies go through an area and they should pay for the water problems they have caused. Oil and gas companies should be made to pay without a fight. The private farmer doesn't have the money to go after them for the contamination they cause.
- If any of the above are due to pollution from sources off the owner's property (e.g. ILO's, petroleum exploration, etc.). *Provincial Government*
- If oil companies are continuing to use "our" water, then they should be accommodating their equipment to put in "pipelines" for water for future "water problems."
- Let big business/corporations fund their own projects. Irrigation programs must be funded by the user. It's a huge freebie that needs to be recuperated by the taxpayer.
- New development should find and fund their own water source. *Owner*
- Rural people have made a choice as to where they live. Along with that choice is their responsibility to ensure their water is safe.
- Provide incentives to private and industry and commercial water users to minimize water use.
- Differentiation must be made between residential private (there by choice) and agriculture (there by need) decisions made seriously affect loss of prime agricultural land to acreages.
- Develop map and forecast groundwater reserves.
- Sustainable recycle and filtration systems.
- Water co-ops to deliver treated water supply.
- Instead of moving water to the industry, move the industry to the water.
- Allow lower standards for non potable water. Regulate bottled bulk water.
- Develop standards for private water treatment plants on individual lots. Allow point of use treatment for food preparation, drinking and dental hygiene.
- Haul water for livestock watering. Many livestock producers rely on dugouts, ponds, etc. When they go dry they can no longer be used for stock production. Many of these have conserved water all their lives. Shouldn't be penalized now.
- Provide alternate water source if current source rendered unusable by conflicting approved use. Oil contamination of aquifer – very expensive to clean up.
- Provide a one-stop shopping source for the private users needs in educational equipment. What is the best way, is it safe, how much should it cost?
- A cost shared program for rural water co-ops similar to rural gas program.
- Private operators should have the same privileges as urban dwellers.
- Developing watershed groups to enhance creeks and riparian zones and keep tabs on the health of the creeks by using these tools.
- Eventually mega-projects to transfer all water.
- Conquerville water co-op 1/4 and 3/4 in 1989. 50-50 in 2000.
- Research into treatment options for individual wells and small co-ops (sewage treatment).
- Information sharing/providing about the knowledge gained in that research and elsewhere.
- Maintain adequate levels in dams to supply down stream aquifers.

- Build infrastructure to store water.
- Water testing should be responsibility of individual land owner. So if move in after, personal water should be tested by individual land owner.
- Free voluntary testing available for private systems. Health units continue to test water for safety.
- Would not like to see forced potable water to rural residents.
- For monitoring water safety government could supply some water analysis.
- Private water use (e.g. cattle production) is polluting and degrading a public water resource.
- Initial set up cost is high and training is expensive. *Shared*
- Provide seminars and forums to learn how to protect and test private water supplies. *Provincial Government*
- Develop a mega water storage system for southern Alberta (e.g. Meridian Dam). *Provincial Government*
- Private water systems should assume responsibility for their own water quality, however costs of water analysis should be more reasonable or done free by the government. Regional systems should be encouraged for raw water and again users should be responsible to maintain their water quality. Regional systems for power, telephone, natural gas have all survived and improved the life quality to all Albertans. Water (a life sustenance) should be available to everyone.
- Develop pipelines: regional water supply systems (water co-ops) to deliver a "treated" water supply to rural residents and urban centre's.
- Develop wells in drier areas of province, with storage, to assist in dry years, for drinking and livestock use. This would provide options to assist ranchers in dry times, by temporary pipelines – or trucking to the site.
- Province should help with the development of water systems.
- Education on what treatment is required and the equipment needed.
- Education on how to avoid pollution and conserve supply.
- Shared - because it is not just up to farmers.
- I personally believe the government intends to sell water like it does oil, gas, lumber etc. Encouraging people to expect the government to pay results in a welfare mentality, and developing arid areas is, well, talk about money down a hole.
- Industrial users are allowed to drain huge amounts of water from local water sources via crown land - if this drains completely or reduces significantly a private individual's source of water, the industrial company and the original government that allowed the use of water should be held responsible.

did not indicate location

- I believe every individual should be responsible for developing a working system for their farm or ranch. We cannot expect government or anyone else to look after us. We do however need to have a clean water supply left for us to work with. If an oil company or any industry, other than an average farming operation, contaminates our water we are powerless. Every Albertan, farmer, rancher, oil company, industry and the government need to look carefully at contamination of water. Leave something for our future generations.
- Again, the need to protect water supplies through education and awareness. Prevention is the first key, encourage less use of harmful substances/pollutants into our water supplies and applying laws which will be more stringent and adhered to.
- Maintaining watersheds and wetlands as filters will go a long way to maintaining the quality of our water.
- Although if regional industry is causing contamination or depletion of aquifers, then they should pay.
- Provide tax relief for rural industry/residents to recognize costs - particularly in drought. *Provincial Government*
- Allow regional water systems private and public to develop safe potable water supplies and distribution systems in rural areas for profit.
- Promotion of conservation.
- Develop individual water supplies when area water has been contaminated.
- Develop better treatment for sewages and supply through support development programs. Make effort to protect water supplies. Use all available technology, not a chosen few.

- Nothing can replace optimism.
- Government help to replace water supply should be done after licensed people properly abandon old wells. Most people won't invest money into something they can't see pay back. The only way groundwater protection will happen is if the provincial government pays for it. If groundwater can't be found, farm site or business should be moved, as this problem will never end.
- Do not recognize drought.
- Ensure adequate supplies are available to property owners. Reduce commercial use if necessary.
- There should be no dugout filling from other water sources. Animal and livestock owners should have proper watering setups.
- Water quality testing for drinking should be annual and compulsory. Many rural people I talked to thought the initial well testing was all that was needed, even if it was 20 years ago.
- More manpower needed for enforcement of regulations. Cost industry more money to treat and monitor their effluent waters.
- Develop regional water supply systems of treated water.
- I think domestic monitoring of drinking water is the responsibility of both government and the property owner, but if the water is being used in feedlot or heavy industrial activity, it is the private owner's responsibility.
- Regulate pollution from sewage and storm water to ensure that drinking water and aquatic environments are fully protected.
- Create more "community wells" for families to pick up water reducing travel time to/from current "community wells."
- Offer to drill wells for rural and farms from taxes already collected or included. Rural residences pay approximately one third property taxes of municipal residences but receive very few resources in return, usually only schools and roads plowed.
- People using water are part of the ecosystem.
- Polluters should be responsible for cleanup.
- Make sure all rural and urban groundwater and surface water supplies are maintained in a healthy state by the process of wise land use planning.
- Provide treated water supplies for any resident
- Stay out of private water systems. Well users paid for their wells, not the government and business. *Owner*
- Our group respondents were agreeable to 1 and 2 but did not consider any of the above to be government responsibility.
- Establish performance objectives for private systems.

Small Municipal Systems

7. Do you get your water from a small municipal system?

One respondent chose to comment on question 7.

did not indicate location

- Make water pure to start with. I haul it 100 miles.

8. Alberta Environment currently sets and enforces drinking water standards for every Alberta municipality, reviews the water quality reports prepared by each municipality, and certifies the facility operators. Small municipal systems, however, are still more vulnerable to possible contamination as they are less able to invest in new technologies and overall improvements to their water treatment facilities. Considering this, please review the options below.

Respondents commented on options presented in question 8 and also provided their own examples.

a. Supply technical advice to small municipalities about facility operations, maintenance and monitoring.

north of Red Deer

- Private firms - not trustworthy when it comes to something as important as water safety.
- Province must ensure standards are met and maintained, but some municipalities may need help.

Red Deer and south

- This will monitor results of tests? Private involvement in water management and delivery has been problematic in other places. *Shared*
- Should keep the services provided by Canadian businesses not contract out of Canada *Provincial Government*

did not indicate location

- Build new systems.

b. Monitor the quality and safety of water at small water treatment plants.

north of Red Deer

- Whoever does this, there should be high standards and checks and balances to prevent disasters like those in North Battleford and Walkerton.

Red Deer and south

- This should be minimized and not subsidized. Government should limit and control where it is feasible; citizens should have to pay full costs. That will reduce development and growth where the environment does not or cannot sustain it.

did not indicate location

- A.B.B. automatic monitor systems.

c. Develop regional water supply systems.

north of Red Deer

- But at what cost?
- In the long-run is this feasible?
- Determine most economical method to provide an adequate supply of safe water. *Provincial Government*
- This would only add to the Alberta Advantage.
- This seems to be a logical and practical approach and should be supported by large municipal's. Alberta should encourage and provide assistance for this.

Red Deer and south

- Depends on circumstance (e.g. Bragg Creek, which is now draining down Calgary's supply upstream could make an arrangement not to drain water, and to receive treated water from the city - a MUTUAL benefit). This needs to be case by case!
- The provincial government should not be in the business of supplying water systems. For example, if a city wants to supply outlying communities with water, a joint agreement should be in place for cost sharing the infrastructure between both parties.

did not indicate location

- Individuals need water, so they should have to pay for part of it, but the government also has a responsibility to help get it there.
- Protect what was there naturally.
- Provincial help to finance projects, but towns should be paying the cost in time.

Add your own example...

north of Red Deer

- Protect our watersheds. Water treatment will be less costly if our water is protected from unnecessary contamination. *Shared*
- The hamlets of Ardmore and Fort Kent are currently being supplied water by pipeline from Cold Lake at the expense of provincial and federal government grants, as well as partially by the municipality. People who live across the road from a hamlet's boundaries are to pay approximately $4,000 plus cost of piping in over X number of feet (unfair).
- Mitigation and quality.
- Regular retraining of staff who test (etc.) drinking water.
- Ensure a Walkerton event does not occur.
- Examine possibility for untreated water delivery and provide subsidized home purification systems as 90% of delivered water is used for lawns, clothes, car washing, etc.
- Funding for training to keep local people 'up to date on changes'.
- Ensure intake water supplies are good quality by land use that protects water sources in the form of wetlands, lakes, rivers, etc.
- Reduce the number of small municipalities. Let some 'die' so not so many.
- The necessary services should be supplied by whoever can provide it most economically.
- The money all comes from the tax payer so it really doesn't matter.
- Permit private for-profit organizations. Develop/provide water distribution systems.
- Funding/infrastructure.
- Since government's open arm policy regards development of all kinds as a big economic plus, it hadn't better forget what will get flushed into the environment and how much of it we taxpayers will have to treat it before we turn on a home faucet.
- Protect water quality of source.
- The provincial government is in charge of the Water Act and thus responsible for enforcing its regulations.
- Monitor surrounding agricultural and industrial activities that might contribute to contamination of water supplies.
- Oil and gas companies should be responsible for any ground and water contamination and clean it up ASAP.
- Municipalities should manage the system once installed. The provincial government should fund a portion of the initial investment.
- Small municipal systems should be treated the same as large systems, despite some of the problems associated with it.

- Supply of water and testing of quality. *Municipality*
- Develop a grey water system from rain, etc. for toilets. *Shared*
- Just apply existing agenda and modernize existing systems.
- Maintain water system (infrastructure).
- Training to keep operations up to date.
- Develop a crown corporation that has the ultimate responsibility to provide safe economical water for aquatic ecosystems and domestic use without being hampered by short-term political industrial agendas.
- Private firms or consultants might be used to provide expertise on construction, but the government must be responsible for results. *Provincial Government*
- Protect/restore local water supplies. *Shared*
- Again develop more treatment sites on rivers to supply farms, dwellings, towns, etc.
- Province can and should assist municipalities in these areas. Shared knowledge and experience would seem to have the potential to lower costs for overall society, rather than each small municipality re-inventing the wheel.
- Watershed land use planning.
- Educate people on household water treatment options, manure handling, and fertilizer use.
- Promote wise water use within municipalities.
- Ensure sustainable future water supply.
- Monitor private firm's objectives and profits Who is making the true profits?
- The Provincial government should have ultimate responsibility for both quality and availability of water but local or municipal partnerships should be possible and probably desirable.
- Certification and monitoring of operators and retraining.
- Follow up action to reported non-compliant situations.
- Who is responsible if something goes wrong? Where do sewage and treatment get involved. People, cattle?
- What about smaller areas, summer villages.
- Always share costs for these services as it affords a degree of monitoring together with education and by making the user help pay, they take a very active interest in the W5 of the whole thing. (Shared)
- If any municipality provides water and the quality is poor, who should pay compensation to those affected.
- I am not in favour of privatization!! These questions are skewed !
- Install better water treatment technology in small town systems and update distribution systems to conserve water.
- Use constructed wetlands to treat wastewater. Already in use in France, Germany and Austria. Check it out. Cheap and maintenance free.
- Educate.
- Develop regional operating mechanisms (share costs of employing skilled operators and monitoring personnel).
- Since the water flows rapidly, the quality may change due to seepage, dumping, etc. and affect all persons downstream. Therefore, it is the government's responsibility and network capability to ensure notice and quality for all.
- Encourage population/industrial growth pattern on availability of water.
- Ran Ferly, Alberta case in point.
- Whoever is accountable – private, municipal or provincial government must utilize an auditing component which communicates with those who have a vested interest.
- It's the Provincial Court that should oversee such things and certify them.
- If Alberta Environment controls standards THEN Alberta Environment should control alternatives!!!
- It's 2002, municipalities should have qualified people to take care of this kind of stuff. *Shared*
- Small water supplies i.e. municipalities should be responsible for the community water supply but they should be monitored by provincial government.

- Promote subdivision development according to conservation technologies. Especially in groundwater dependent areas (landscaping, plumbing, waste management, grey water potential).
- Development and maintenance of conservation infrastructure (pipelines), sewer lines, waterlines, treatment, etc.
- Don't raise the bar too high for qualified people to run local treatment plants – they are doing fine now.
- Gone to far extremes since Walkerton – we are doing fine with the people as it stands now.
- Provide incentives for all municipalities to develop regional water supplies, where possible. Assurance of quality and supply.
- Provide incentives for small municipalities to provide adequate and secure water supplies.
- Certifying and re-certifying those who monitor municipal water supplies to ensure Albertans receive the highest quality of water available.
- Develop regional raw water supply system from source to treatment facility. (Provincial Government)
- Assistance for isolated areas and northern Alberta where distance and disparity are factors not faced in more populated areas.
- More and more people leaving rural areas to city. Long-term costs too much.
- If an individual chooses to live in a municipality who should pay for water provisions.
- Support research on reverse osmosis for small communities or provide financial incentives for making upgrades.
- Water testing should be made possible for the private person.
- Regionals are not the cheapest but in the long-term I believe it to be the safest, most operationally effective system we can operate. By expanding these systems water can be as safely transferred from one basin to another (inter-basin transfer) as is able to be done. From Ponoka to Calgary water should be supplied from the North Saskatchewan increasing rather than decreasing flows in the Bow and Red Deer. It may be practical to extend this even farther south.
- Everyone responsible.
- I can't see our water supply weakened to fill dugouts, gardens, etc. I feel strongly there are other options for them to use.
- In the local hamlet, the municipal district councillor crawled up the water tank, poured in what he thought was the appropriate amount of chlorine, then crawled down again. Apparently, he miscalculated. Now, when you turn on the tap, the water tastes horrible and was the initial problem solved? Who knows? Mr. X had no training in water management. Horrifying.
- Presently, some municipal water systems have high rates of certain minerals (e.g. manganese). The public should be made aware of the harm to their health by drinking this water over a long period of time.
- Small municipalities have no control over poor water quality, quantity, nor the ability to invest in high cost treatment plants, if needed.
- All sources of outside contamination should be under strict guidelines of the government.
- No standards for bottled water.
- Wise land use planning is important to protect watersheds, wetlands, etc.
- Ensure intake water supplies are good quality by wise land use planning that protects watersheds, wetlands, lakes and rivers from destruction and pollution. Protect water from above the intake pipe; water treatment will be more cost effective.
- Develop local water supply systems.
- Balance population growth with the availability of water quality and quantity.
- Depends on who is pushing the issue if water is needed badly government has to help.
- Ensure that industry and intensive livestock operations do not contaminate local supplies.
- Make sure the provincial government monitors the municipal systems. Can't download all provincial responsibilities. Basically monitor the municipalities monitoring operations. Spot checks.
- This question appears to support more government control and interference. This appears to be a departmental attempt to justify a big expansion.
- All of the above used to be compulsory under the acts Provincial/Municipal.
- Safe surface for groundwater supplies. Watershed protection management.

Red Deer and south

- Only if quality is maintained is the whole population provided a safety net re epidemics.
- Ensure that control of all water supplies and delivery is by the public sector (i.e.,municipality).
- User pay - ensuring that the costs of such systems are paid for by the users
- Increase benefits to attract and keep competent facility operations if communities want to survive and have safe water supplies.
- Take enforcement actions. Force municipalities to meet minimum standards.
- I am 99% sure all this pipelining of water will trigger NAFTA. It is already triggering company monopolies. EPCOR is talking to Hobbema and others as well. Big is not always better. Many of these small municipalities have water problems and are considering linking with larger towns/cities to get access to quality water servers.
- To some extent I agree with this but the research is scant to lacking as to benefits/costs/environmental harm. Town and municipalities around Red Deer are considering linking to Red Deer water and sewer treatment. Great idea but needs independent study. There is considerable risk of not having enough water in the Red Deer River!
- Regional plans that encourage industry and population to locate in areas with adequate water supplies.
- Don't assume that just because it is a small centre, that they don't care for their water treatment.
- Promote water conservation.
- Promote grey water recycling.
- As government is actively promoting and has limited any kind of input or say of approval of these massive hog operations, government should be responsible for keeping rural Albertans water clean and safe. We are not second class citizens.
- There are degrees of responsibility related to the degree of threat. In an urban, semi-urban area, area of oil and gas development or intensive livestock operation, the responsibility needs to be spread out to government. If out east, in a clean aquifer - landowner could do his own testing - low threat of contamination.
- Make regionalization of water provision and wastewater treatment financially feasible.
- Any programs for funding should be equal. Smaller municipalities already get significant financial breaks for policing, wastewater treatment, roads, etc.
- Ensure the preservation and protection of water resources (e.g. wetlands).
- Ensure the collection, preservation and protection of run-off water (i.e. excess water).
- Government to be able to assist technically for plant design and operations/troubleshooting for small facilities.
- Ensure intake water supplies are of good quality by wise land use planning that protects watersheds, wetlands, lakes and rivers from destruction and pollution. By protecting water above the intake, treatment costs will be lower.
- By the time the water gets to Redwater from Edmonton, it's not nice. Try saving a glassful overnight, looks like ****!
- Walkerton happened because of sloppy, unscrupulous municipal employees and bad original municipal decisions but most importantly provincial government cutbacks and sloppy monitoring.
- A Provincial Health Authority could be in charge of this stuff relieving the workload.
- Let's re-establish the Department of Health as an entity at arm's length from Alberta Environment. Then there is a second safety or at least another department to address concerns to.
- Provide assistance to agriculture to protect riparian.
- Develop regional water supply systems in other areas of Province. *Provincial Government*
- Municipalities obtaining water from larger centres are consulted on all changes affecting their water supply (e.g. Calgary voted 52/48% in favour of fluoridation. Airdrie ad no say in the matter - when they could have tipped the vote the other way, yet they must consume and pay for the fluoridated water).
- Develop two classes of water: potable and non-potable. In larger communities the distribution to industrial users would be easy - and less costly. Non potable water may be reused by a manufacturer.
- Quality and safety of water should be checked by an outside source once or more times per year to present "fudging" of test results covering up unsafe conditions (as occurred in Walkerton).

- Develop and enforce standards to municipal water supply and treatment operations. (Shared)
- Monitor and enforce drinking water quality measures at facilities - to avoid a Walkerton.
- Rockyford should receive shared responsibility care. Government must ensure we don't have a pollution disaster like Ontario had.
- Regional water and sewer systems next to large urban centres like Calgary.
- Access to existing water and sewer lines in rural areas between urban centres for rural businesses and residences.
- Conduct detailed "surprise" (i.e. unannounced) inspections of all municipal systems.
- Provide regional systems by adequately densifying growth corridors.
- Supply funds to improve facilities.
- Department of Environment and/or Department of Health should have responsibility for water quality and have the authority to enforce regulations to reduce or eliminate contamination.
- All water development for towns, villages and cities - including monitoring - should be a provincial responsibility.
- Field truthing of what is on paper.
- Infrastructure grants should be funded from provincial funds during years of higher revenues.
- Ensure capital funding is available to small communities.
- Use student internship programs or promote the hiring of newly graduated university or technical college students in the appropriate areas as a means to provide a more consistent source of trained employees.
- Consider pollution implications of industry applicants on water supply, before granting approvals. *Owner*
- Institute widespread conservation/efficiency measures. *Owner*
- Instal modern, state of the art water supply and distribution and operating systems. The technology exists to operate and monitor intakes, pumping systems, distribution lines and reservoirs to optimize performance and minimize losses. Requires investment in technology and training of staff.
- Develop strategies, policies, objectives and bylaws for water conservation within municipalities. Water conservation within municipalities can impact demand from 20 to 50% without hardship.
- Infrastructure repair, replacement and leak detection. Many rural and small municipal systems lose up to 30% of the water from source to point of delivery.
- In the wakes of Walkerton and North Battleford, provincial inspectors should sample water periodically. *Provincial Government*
- Transportation of water from other sources.
- Feed lot alley in southern Alberta is a time bomb waiting to happen. The groundwater has to be polluted by now.
- Focus should be on protection of watershed.
- Enforcing laws.
- Ensure clean filtered water is available to each household. Drinking water from dugouts is risky. Un-pure water consumption is dangerous and homeowner can provide purifying system
- Clear, enforceable laws.
- The province could underwrite bond issues to obtain lower interest rates. *Provincial Government*
- Alberta Environment changes rules and regulations of small water systems, after a municipality sets up and licences the system.
- Develop mechanisms that bring water management and land use management within the same context.
- Provision of capital for facility upgrades.
- Define standards of training/certification higher than currently in place with process of liability (personal) if not adhered to.
- Manpower support to ensure staff security.
- Rural water co-ops.
- Lobbying found from the government. *Provincial Government*
- Everyone should pay their own way.
- Develop new ways of containing and treating human sewage and waste. Human pathogens routinely are isolated downstream of municipal sewage treatment facilities.

- Ensure water monitoring is performed by qualified staff and not private corporations.
- Make MLA's responsible to have water systems checked and publish results in local papers.
- Establish standard plant and operating systems that can easily fit the needs of small municipalities.
- Integrate considerations regarding water supply into municipal land use planning.
- Provide technically trained and qualified personnel.
- Monitor and ensure training, methods, and reporting is kept current.
- Establish requirements for facilities, testing, qualifications and audits for compliance for municipal water facility operators. 'Public' water supplies must be reliable.
- The apparently arbitrary changing of standards is expensive to deal with for small towns.
- Regional networks, gradual upgrading or grandfathering should all be looked at.
- Control industrial use of groundwater that can effect municipalities' supply and quality. *Provincial Government*
- I fear private and/or small municipal government technical expertise. Province should supply technical advice and personnel.
- Put resources into water quality at source (i.e. watershed).
- Tiny communities can use wells with conservation and testing at prescribed intervals.
- Regional water supply systems are working well, but all needs should be balanced.
- Encourage citizens and industry to minimize water use.
- Provide funding for upgrades.
- If you do this, also develop regional water treatment systems.
- Mid size municipalities should have regional personnel to monitor small town water supplies.
- Provide one overseeing portfolio at the provincial level to monitor all of the above.
- Individuals do it and pay for solutions under municipal district direction.
- Explore EPA's (U.S.) on managed decentralized approach to water and wastewater management.
- Develop partnerships where private sector firms operate co-ops, decentralized private facilities.
- Build better wastewater facilities. *Shared*
- Build more storage capacity such as water towers, etc. *Shared*
- Develop a standard treatment and distribution system. Reduce the number of 'orphan' systems, cheaper in the long run.
- Test and train water operators on continual basis.
- Water co-ops could use small municipal systems as a supply. This would defer costs between more users.
- Pipelines to municipalities from major reservoirs.
- Monitor operations and results of quality analysis.
- Provide training for operators of water systems.
- For small hamlets cost to comply becomes expensive.
- Individuals must assume the ultimate responsibility for what they ingest, be it water or food.
- Some help with testing of small municipal water operations. We can get people to test who are capable but do not have grade 12. We need help.
- Not familiar with municipal and urban water rules and regulations.
- The users should pay the development and operating cost but the province could provide low interest long-term loans to help.

did not indicate location

- Large municipal systems got provincial monies and this should be shared with other rural communities through assistance etc.
- Private sector including landowners and grass-root groups could be brought into the processes of ensuring quality, safety and quantity so that there is an understanding and appreciation of how a small municipal system works and of the complications and issues that can occur.
- If you want to stay on this planet, you will have to look after water.

- Develop regional/municipal economic zones of activity based on availability of required water supplies e.g. farming, ILOs, urban growth zones.
- As most municipalities don't completely control events that affect their water, a regional presence is necessary.
- Allow private enterprise to develop regional water supply systems in small municipalities and operate for profit.
- Do not approve polluting systems. Make sure new installations are clean.
- It will work. No water no food.
- Supervision should be provincial, no matter who pays.
- Ensure that small municipal systems use the best technology.
- Through the process of wise land use planning that protects watersheds, wetlands, lakes and rivers ensure that intake water supplies are good quality.
- Enforce quality corrections of deficiencies (no point in monitoring if results ignored or falsified). We should all pay taxes to allow everyone access to good drinking water, but we do not pay taxes to allow them to waste it or use in harmful ways to the environment.
- Provide periodic 3rd party monitoring of urban pipe point discharge with enforcement.
- Monitor and enforce the water act on oil/gas companies. Most are foreign-owned anyway. Why should they leave damage behind?
- Establish performance objectives for all systems.
- Apply existing rules and regulations.
- We agree to 1 and 2 above but not 3.

9. Do you think companies (public or private) should be allowed to invest in water systems and provide drinking water to small municipalities?

A number of respondents chose to comment on question 9.

north of Red Deer

- This could depend on a number of things, supply, who, costs, source. Public or government controlled would be most desirable.
- A formula for corruption and disaster, already tried and failed in Britain. The formula is simple: buy in, make money off it, let it run down, then bail out before you have to maintain and repair it and let the community fix up the mess. Don't even think about it!!
- Private investment looks at profit first and quality second.
- Due to heavy costs, wages, etc. company could give themselves a 33% raise like politicians and the cost goes directly to consumer.
- Provided they are well monitored.
- Conditional provincial government needs to ensure water quality is maintained.
- Companies should not have the ability to sell the water – only to charge for delivery.
- Yes, but must be strictly regulated.
- Only if financial records made public and government has power to control private companies.
- Economy before human use?
- Water should be publicly owned and operated in all cases for the good of all.
- Undecided – need more information.
- Very important that water be publicly owned and controlled - once private companies take control everyone pays and we have no control.

Red Deer and south

- No – unless highly regulated.
- But under a regulated regime that won't hold the consumer hostage.
- Regulated, not as a monopoly provider with only the market to control price.
- Privatization results in monopolization/price increases. Also more likely to become an exportable "good" under NAFTA.
- As long as water quality and safety also checked by an unrelated source like the provincial government.
- This is my first response without examining this more closely. When a company's interest is to profit maximize, they will act in their own interest in many cases.
- This may be a very reasonable constraint! For a very valid reason! Particularly re irrigation.
- Difficult to answer. Having a private company in control of a water supply seems a touchy situation.
- We must be very careful about profiting from water. Once water is allowed to be sold, it will become a part of the free trade agreement.
- Yes - companies can operate systems, treatment and distribution. No - they absolutely cannot be given ownership or control over the resource.
- They would have to be regulated by the government.
- Generally no, they are not accountable to citizens and established governments kow tow to their demands even if detrimental i.e. limiting regulation and/or maximizing profits.

did not indicate location

- It's like for profit health care.
- Have seen private systems (inherited one in Lacombe) - they do not work.
- Too many opportunities to monopolize.
- Unless strictly monitored by municipality or provincial government.
- No for-profit companies should ever be involved in the water supply. Look at England's problems in this area.

reliable, quality water supplies for a sustainable economy

10. Please review the following list of options, indicate the extent to which you agree or disagree with each option.

Respondents commented on options presented in question 10 and also provided their own examples.

a. Determine groundwater availability throughout the province.

north of Red Deer

- To take pressure off river use.
- Recycle used water for showering, bathing and toilet use.
- People should be made to change old fixtures in home to water saving (e.g. toilets and showers).
- Allow selling of excess water allocation.
- Encourage more efficient use of water through "conservation fines." If you are wasteful or more importantly pollute water you are subject to a fine (e.g. contaminating groundwater, etc.).
- Can we not measure this as we drill for oil?
- Why? This area has been kicked around for years, I do not believe there's no info!
- Group session said there have been sufficient studies done already.
- This would leave no expansion of livestock, etc. Definitely against the Charter of Rights.
- Let people live where there is water.

- User's responsibility.
- Determine availability but this doesn't mean we must use it for commercial purposes.
- Petroleum industry has drilled 100,000 wells, but Alberta Government has no inventory of groundwater.
- I don't want to see the groundwater depleted if the river has run dry. What is the cause?
- To effectively manage water in Alberta, you need to know what you have. Better groundwater information is a requirement.
- I think this should remain untouched.
- If it goes ahead at full cost oil industry.
- Make sure we check the impact on the entire environment and everyone is informed of all the information. Get people involved at the start.
- We should have more knowledge about groundwater, but it is not a panacea for our water problems. Aquifers are easily depleted and irreplaceable.
- Too many ecological problems.
- Why not some – a % or formula? Is this possible?
- Encourage use of alternative technologies in industry.
- Review industrial licenses yearly.
- We should do this not for the purpose of providing more water if river basins become fully allocated.

Red Deer and south

- Only if you want to destroy this province.
- Don't jump to wasting groundwater the way we waste surface water.
- The province does not know and yet it allows oil companies to extract billions of gallons of water per year for oil floods.
- They do have considerable information, but have not developed information systems to manage or analyze the data.
- Sounds dangerous for ecosystems.
- Rehire all those people who got pink slips and get them out in the field with test equipment and in offices with computer programs. Apparently this is already being done. Was it limited? Need updating?
- Shared information with industry (re seismic). Alberta Geological Survey.
- Make it imperative that all users return water to the system in better shape than they found it.
- Look at water collection purification systems for all users (e.g. snow melt water).
- Already been investigated a number of times and discarded.
- Determine input rate and what effect the use of this source will have on surface water bodies and soil moisture.
- There is a significant risk of major ecological damage from such a process.
- As resource is needed. Would be valuable to know where they (aquifers) are so that activities close to them don't contaminate them (e.g. oil and gas activity).
- We need this kind of information as well as consequences and potential of groundwater use.
- Use information from private wells and oil and gas to map.
- A proactive approach, yet I maintain if implemented the actual cost be covered by the end user.
- One would think that with all the seismic activity business must have an idea.
- When oil companies do not know how much oil/gas is underground, how do you think you can know where and how much water there is?

did not indicate location

- If you do not know what you have, how do you know where you're going?
- I do not want to see this happen.

b. Allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin.

north of Red Deer

- First in time belongs only to aquatic environment. Then comes people.
- Equal cutbacks to all license holders.
- First/first ignores technology, human needs, future held hostage to the past.
- All costs shared between all users. Ecosystem is priority. Everyone else is second.
- The rule is wrong. Not all available water should ever be allocated. Must leave a large precautionary buffer for poor run-off years.
- Needs to be examined regardless.
- Review existing licenses. First in time, first in right, regardless of use needs to be re-examined.
- Depending on what the request or need is, household water should come before industry (i.e. oil companies).
- Companies taking fresh water from rivers should be controlled.
- First in time, first in right is a good way to manage the water resources.
- First in Time/First in Right rule should be abolished – NO grandfathering.
- Senior license holders should receive more water. Juniors should receive less.
- The "first in time/first in right" rule needs an overhaul. Many irrigation licenses would have been granted when water was not under the pressures of increased population, industry, etc. and may not be environmentally and economically viable. Who decides how it should be used is very problematic as too often this Province has put short-term economics ahead of water sustainability.
- We need to establish a hierarchy of importance.
- In over-allocated basins, hard to allow more use. However users may ask to transfer or purchase from priority users!
- There should be a limit on basin allocations, however, the first users are not necessarily the most efficient or most deserving.
- Review all water licences and decrease old ones, but don't allocate fully the water basin. This is only water management for industry not for Albertans.
- FITFIR may not be the most efficient use as industry with old licenses may not find it is economically worth it to upgrade so they use less water and because their license can't be revoked, they don't care and aren't motivated to do a better job. That's industry bottom line - its most important [priority] - not good water management. Maybe some of the old operators should lose their license or have their license cut back to make room for new operators - not just tax the system with overuse.
- Each potential user or project should be assessed on its merits.
- But how do you prevent use? How do you decide when is enough?
- I agree with the last part of this statement but disagree with the first part.

Red Deer and South

- Need to incorporate consideration of efficient and appropriate uses.
- Needs and times change. Also new technology may become available.
- Water must be in hands of the crown.
- You can say "no new licenses" but what are already allocated should have a choice to get by with less water or more water from someone using less than allocated.
- Should be based on provincial priorities for economy and quality of life.
- The assignment of water licenses on a first come basis will prove to be unacceptable in times of critical shortage.
- Older licenses should not be "grandfathered" because they may be wasting water. Allocations should be based on need not on age of license.
- Licence holders should have to verify need on a regular basis or lose rights, but it could promote misuse if not careful.

- Set out a priority use system so that early trivial water uses cannot over rule later; much more important water uses. Growth must be limited to what available water can safely support.
- Allocation holders should be required to meet certain criteria or guidelines in order to maintain their allocation: managed use, efficient use, environmentally sustainable use.
- Should be eliminated as it does not encourage improvements in water use efficiency especially for agricultural and industrial use.
- The first use may have little benefit and thus be inappropriate.
- Is the "first in time, first in right" tradition still a good idea? Don't know what would replace it; are there any good ideas out there?
- If all water is currently allocated then in times of drought/flood may impact users which have come to depend on licenses (socio-economic impacts).
- Equal opportunity for everyone.
- There is an opportunity to allocate water for specific beneficial use within water license transfers. "First in time" rule may still be relevant if unused licenses (or portions thereof) can be reallocated for other uses. A watershed management plan would aid in determining where water can be best used. A multi-use/multi-benefit approach to watershed management for water related developments, both current and new may have merit. A reward/incentive system, perhaps the granting of an allocation, assistance could be used. By clearly understanding the sustainable ecological limits that a watershed has, proper planning and strategic analysis for future economic development can occur.
- This ensures available water with controlled growth.
- Water rights can be bought.
- Do not believe we should allocate all available water by FITFIR rules. We always have to consider fluctuating water conditions and weather patterns.
- Aquatic ecosystems must have priorities over all else. Without our rivers, we are not a healthy Alberta.
- Existing water rights of citizens cannot be taken away. Consider that additional demand may not make sense.
- FITFIR may not be a perfect solution in all circumstances, but adopting any other system amounts to an expropriation from those who have often paid and built lines around their rights to water. Most are citizens and they will not be able to compete with large corporate interests if allocations go to the highest bidder or economic "value."

did not indicate location

- Does residential have priority? Quantity of water is limited for each water right.
- If you want to promote growth in any area by restricting new incomers out, economy is going to die.
- Keep pumping and collapse will come.
- Water rights should not be grandfathered.

c. Allocate water based on its most beneficial, or valued, uses.

north of Red Deer

- Too subjective.
- Does allocation of water based on value mean ecological, economic or human consumption values?
- Industry has been given this right ahead of human consumption already.
- Assign value based on sustainability.
- Too variable. Too many widespread views and values. What we value may not be the best for us either (e.g. if we value consumption of all the water and we act on this – it will leave us 'high and dry' literally in the long-term).
- This would create lobbying and could be abused.
- Highest valued use may be distribution blind.
- It's just? And best use does change. Municipal/household use may need priority over some other user.

- Unable to respond to third question as don't know what 'value' means.
- Given this, how can I agree or disagree to an unknown?
- Whose Values?
- This idea sounds good, but it depends on which values are used. Economic value could supersede rights to drinking water.
- In regards to the way in which water licenses are dealt with (i.e. the oldest water license holds precedent - FITFIR), why are they dealt with in this way? Perhaps, the license that will use the water in the most efficient manner should hold precedent. This would encourage industry to use water wisely to ensure that they will have an uninterrupted supply.
- This must be human life support, not corporate, materialist items.
- Who defines value i.e. benefit?
- But in-stream flow needs must have highest priority followed by drinking water.

Red Deer and south

- Stop doing wasteful things with subsidized uses of water.
- While greatest and best use makes some sense over the FITFIR rules, what's the greatest and best use? Meanwhile for the last three years, registrations under the Water Act have been based on the FITFIR rules. We can't just ignore that process.
- How is value determined?
- Who is going to decide? If economic growth is the value, then healthy, reliable eco water system will not survive.
- Based on Conservation measures.
- Who and how would we make those decisions?
- Human life would be #1. Allocate a % of water based on "last in time."
- Who determines value?
- Who determines value?
- Is recreation a necessity? Why does it have such a high profile?
- Necessary drinking water for people and animals. Necessary water to keep ecosystem alive. Necessary water to let final stage crops mature.
- This needs some very careful definition for the best PUBLIC (not only corporate) good.
- True. Human value should be greater than economic. May have to sacrifice for human needs.
- Economic value - no. Environmental value - Yes.
- After the in-stream flow needs are met.
- How do you decide "most value"?
- If this means highest dollar value - NO.
- Value: largest dollar or greatest benefit to all?

did not indicate location

- Who decides what is most valuable?
- NO – economy may be most important to you. While quality of life . . . and water . . . may be most important to me.
- Water flood poor choices.
- Who decides the most beneficial? The group with the most money?

d. Allocate water to further uses even if this potentially harms aquatic environments.

north of Red Deer

- Aquatic preservation should be the #1 over-riding criteria.
- We need to sustain all aquatic life and need to start with refurbishing our wetlands.

- I don't think you need to sacrifice aquatic environments – it requires better management.
- Protecting aquatic environments should be our primary concern.

Red Deer and south

- Minimize impact as much as possible.
- No – if you severely damage the ecosystem it will cost mega bucks to restore.
- Damaging ecosystem can lead to its partial or total destruction, which will result in the partial or total destruction of the economic system.
- What happened prior to 1900 when there was drought?
- This should not be in this survey. If there is not enough water, and estimates must be based on low water years, then it is simple - do NOT approve new major operations.
- What about domestic water to a large city on a low river?

did not indicate location

- Already are R and D poor.
- If aquatic environments are harmed, ultimately the human's environment will be harmed. Money isn't everything.

e. Set aside water for future population growth before there are any shortages.

north of Red Deer

- Feasibility?
- Long-term planning critical but a difficult task.
- This should include climate change scenarios - limit expansion in the south now.
- This is right but rather short-sighted if no consideration is given here to the idea of actually limiting population growth now and using the surplus water for the benefit of people today and in the future. Why do we think people in the future will be able to handle population questions any better than we can today?
- Set aside – plan water use for future population.
- It makes sense to impose limits now as a preventative measure.
- Population growth should be curtailed before there is a possibility of water shortage.
- Limit population growth - no more immigration.

Red Deer and South

- Every generation will have to live within limits.
- Develop strategies to ensure that water will be available. Can't set aside water any more than we can set aside air.
- Allocate water according to use.
- Actually you may have to limit population growth depending on how things go.
- Need a safety margin for population/municipalities.
- Population growth is not encouraged.
- Not just population growth. I am concerned that our approach to water management could be too solely focused on HUMAN use, and benefit. We have a responsibility to look beyond that and consider its significance system-wide.
- Or set limits on the population size, so that all can live at a reasonable standard of living.
- How can you gauge population growth (i.e. Calgary)?
- Perhaps continued "growth" is not the answer.

did not indicate location

- But we also need to consider the environment.
- Good supplies. Poorly managed.
- Who knows where the future population growth will be most or least dense?
- Planning with regards to water availability is important – well in advance.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water).

north of Red Deer

- As long as it is NOT inter-basin transfer.
- Province should do - not to be sold by license holders.
- If allocation not used for several years (e.g. five years) then it should be lost or reduced.
- License transfers would only be a way for people to make money off what should be a public resource.
- As long as no one is affected by transfer.
- Use only what is needed. Water license portion.
- Makes sense but only if they are in the same basin or watershed and the means for transfer is in place. But not from north to south hundreds of miles.
- To municipal ties for public good - yes. To another business - no.
- If industry gets water that is allocated for farm production, farms will never get it back.
- This doesn't necessarily 'solve' the problems? At what cost?
- This system will create more problems sooner or later.
- As recommended in the 1995 Water Management Review Committee Report, hold back 10% on a transfer for in-stream needs.
- Transfer, as in sell the water rights and make water a commodity so free trade will let the U.S. get free access to buy water.
- This would put a price on water and give it a value.
- I support sharing.
- Need to have a local value on water to encourage conservation. The less a license holder uses, the more they can sell.
- I agree with this provided that it doesn't result in an over-allocation of water resources.
- Human use - a municipality should always have first use opportunity over industry rights.
- As long as transfers are not sold.
- With some restrictions - for example - should not be able to transfer water for a lower value and for certain not for non-renewable use i.e. production of fossil fuels.

Red Deer and south

- However, there are many negative implications that must be addressed.
- If money is involved, it's wrong. Water is the people's transfer back to province.
- If an individual has spent money on applying for a license or making his operation more efficient so that he does not have the water needs he once had under the license, should he not be able to transfer the license and be paid something?
- The sale of license transfers must not be allowed and transfers must not be private transactions. A license is not a title.
- To attach dollars to this would be a big mistake.
- Should be based on provincial priorities for economy and quality of life.
- Do not sell though. But this has to be done without triggering NAFTA. I suggest a barter system among co-ops or allow environment groups to retire the portion to the river.
- If this occurs it could be like the taxi industry in Montreal!

- Only if the amount of water to be transferred is an amount that has been used by the license holder or if the excess water is from water conservation efforts.
- Not out of municipalities or basins.
- If an operator is not using its allocation, it should have to return the unused portion to the province.
- Who oversees this for non-profit if not the provincial government?
- Why should water become a commodity?
- There would have to be some clearly defined public interest guidelines/rules for this to occur effectively
- This is very risky. Could that license be transferred to an organization for commercial benefit? This, in conditions of restructure, may be less desirable than a use which serves the general public.
- Reduce the allocation use it wisely or lose it.
- Depends on use of person/company to which allocation is transferred. Should be transferred to like use or residential - definitely not to fill ornamental lakes or recreation development in new subdivisions.
- No licensing should be flexible enough to support/promote this.
- Allow a new user to gain saved water from efficiency measures of another existing user.
- Already in place.
- Set fee for transfer – no one makes money off water.
- May lead to oil and gas or ILO buy up of leases.

did not indicate location

- Creates monopolies - retrieve unused water and maintain resource for future ecosystem protection.
- Give more to water flood. So to imbalance other needs.
- Depending on distance-must make sense.

g. Encourage more efficient use of water through pricing to reduce overall use.

north of Red Deer

- Whether we like it or not, water is an economic good.
- Industry laziness?
- Stop giving it away for irrigation - charge the real cost including dam and infrastructure.
- People first.
- Farmers who irrigate should pay extra for any amount that exceeds the provincial average per month.
- To be done at the local level through pricing and restrictions to prevent waste. Not to pay for extraction from surface or groundwater to province.
- Or rationing, or reward conservation practices or other techniques. Yes for pricing for agricultural, industrial and other profit-oriented users, but not for household users.
- For agriculture and especially industry.
- This would give oil companies priority over farmers that produce food.
- Making sure there is NO ?? or waste in present canals and use water facilities.
- Not enough studies, etc., have been done to prove this true. People with money will squander water away no matter what the cost and industry will increase in production cost causing a real hardship for people in low income groups. So far, the Bible does not say water is a commodity to be sold to the highest bidder.
- In-stream needs and basic domestic use must NOT be subject to charge. All charges must be for delivery and treatment, not for the water itself.
- Efficient use for agriculture and industry is an important goal, but a goal to provide more economic benefits will leave aquatic resources dead in the ditches.
- I agree with the concept of metering and paying for delivery. Develop a value for Water and need to conserve. Better conservation – as maybe irrigators wouldn't turn on taps in mid day (30 degree C temperatures) where most evaporates. If charged for actual use would likely not be irrigating mid day.

- But avoid "commoditization" of the resource.
- Must be done with caution otherwise will lose shareholders.
- It's very difficult to place economic value on non-economic water usage. Users with the most money might use scarce resources for industrial purposes while people go thirsty.
- Not proven. Value judgement?
- Pricing would encourage efficiency and conservation. However, we must be careful that water is not simply sold off to the highest bidder. A corporate monopoly that denied citizens access to water at an affordable price would be an extreme perversion of this.
- Pricing – to for-profit companies.
- If we place a monetary value on water then only the rich industry can abuse water maybe over the rights of human use.
- This leaves low income earners at a disadvantage for purchase of water for the necessity of life.
- Education could also promote more efficient use (e.g. trickle vs. pivot irrigation and water lands at night.

Red Deer and south

- Need to balance profit with social good. This seems to equate the two.
- Reflect the true cost. Artificial costs such as m^3 surcharge will not send the proper message.
- There are other options to stimulate conservation. People who use water should be charged to restore it for reuse once it enters the system.
- Bad word. Licensing use is not pricing. For urban users pricing is ok because they are paying for a service not for water per se. Presently city water/sewer users do not pay what it truly costs to provide these services.
- How would the greatest value be determined? Oil/gas – golf courses for rich people? Is this Mexico or Alberta?
- Not only pricing but technological innovations, better usage practices. Allow tax write-offs for development of improved practices (possibly grants).
- Some very important water uses do not result in short-term monetary rewards, so special allowance would have to be made to allow proper allocation of water for such uses. Why encourage or even allow population size to increase up to and beyond the level where each additional unit increase produces more detrimental than beneficial effects on society, province and country?
- I believe in using a combination of policy instruments to achieve efficiency goals (or behavioural changes): 1) Voluntary – through education; 2) Economic – water meters that place a value on water used and encourage conservation in certain households and 3) Regulatory.
- I am very concerned about the consequences of putting a price on water and thus moving it into the realm of tradeable commodity. Some of the implications of that may overshadow the way a price could function as a conservation incentive.
- But uniform pricing for agriculture, industry and public. How do you monitor for theft?
- Water is a right - wasting water is not.
- A bandage solution whereby only the government will benefit financially. We need to start educating Albertans on the importance of a safe and secure water supply. Charging for water does not make more water.
- Encourage may be too weak a word. Legislation may be necessary.
- Who has the most money to put pressure on government?
- For corporations and large industry.
- The rich would get the water, the poor would go without.

did not indicate location

- But conservation still is not going to occur unless attitudes change. Could be able to put revenue toward conservation.
- Supply surplus so things stay clean.
- There should be a base amount of water available to households and industry. Pricing could be used to reduce use above that level.
- Agreed, in the case of individual households.

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations.

north of Red Deer

- In certain areas only.
- Often very degraded habitat downstream. e.g. Abraham Lake, Minnewanka and Oldman.
- It seems that where construction is done on a water course, the result is bad.
- Explore the option.
- Local small scale reservoirs only.
- Disagree because reservoirs fill with silt and become huge liabilities.
- I do not support large storage projects. Cost does not justify means.
- Conservation and good planning are cheaper and better for the environment.
- This just damages another part of the ecosystem - limiting industrial use makes more sense but is hard for this government to do.
- No need to flood lands. Different methods to capture and hold water should be looked into.
- If constructed where they will do some good.

Red Deer and south

- Brutally destructive and unsustainable.
- Even the army corp. of engineers has said no more dams in the U.S. Depends on size. No more big dams or hydroelectric projects. No expansion of irrigation agriculture. They also destroy some types of aquatic habitats.
- If you have to resort to storage, you should not be adding new operations.
- The Colorado River has lots of reservoirs. Sometimes you can walk across the river on gravel. What happens to the ecosystem then?
- Groundwater storage. . . similar to gas.
- As long as the reservoir or its construction doesn't do significant ecological damage to that area.
- Explore subsurface storage.
- Do we really know enough about this yet?
- Only needed because so much has been removed for crops.
- Only to encourage retaining surface and storm water.
- Take a look at the Oldman. Ecological damage - loss - evaporation.

did not indicate location

- Changing our landscape may be more of a hazard to our future water.
- Depends on scale of storage facility: large scale would be bad. The answer is to not fully allocate rivers.
- Go easy - the land loss may be more valuable than the water.
- Dry lakes do not support life.
- Let's become more water efficient.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system).

north of Red Deer

- This has already been investigated and the findings at Cold Lake area have not been applied.
- Slave Lake exit certainly could be used much better. A lot of waste.
- The oil company should learn to recycle and treat the water it uses.

- Only if the water is recycled, treated, stored for future use at NO cost to general tax payer.
- Because of the chemical analysis, etc., in one basin, it could drastically affect the next basin.
- Investigate c/w ?? environment sustainability study. Information has been gathered for the example cited?
- Possibly some very limited cases. NOT for heavy oil production.
- No water transfers.
- Who pays?
- I do not support such a program to build infrastructures that will allow ? distribution to U.S. developments in the desert.
- This is a terrible idea – economically and environmentally. The users of river basins should live within the constraints of their ecosystems.
- This is all about diverting for industry - it should not be done. The earth has formed that way - don't mess with it.
- Disposal of in-basin water threatens the balance of individual eco bio-diversity.

Red Deer and south

- Develop where the water is.
- What are implications of water re-entering the system after primary use and loss of volume in supplying basin?
- If reservoirs are kept for their original purpose - not recreation development that ultimately will dictate the way it is run tremendously.
- Could create X-contamination within basins. May work for potable drinking water.
- Make sure that no significant ecological damage will be done by such diversions.
- Can we justify pillaging one system for the benefit of one industry? This would have to be looked at VERY carefully.
- A proactive approach, yet I maintain if implemented the actual cost be covered by the end user.
- "Investigate" does not necessarily mean "do."
- Last choice by pipeline.
- Do not agree with companies using potable water for oil well injections.

did not indicate location

- Only to effect supply of drinking water to towns.
- Risky business.
- And what happens to the ecology of the river (or water) system robbed of water?

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another.

north of Red Deer

- This could destroy fish and aquatic growth in the water of the rivers.
- EIA, there will be ecological consequences. Investigate with environment sensitivity.
- For the thousandth time–NO!

Red Deer and south

- We should have learned our lesson about this one. It is far too dangerous.

did not indicate location

- Bad practice.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods.

north of Red Deer

- Small scale limited cases only.
- Only within the limits of their licence - total withdrawal and peak withdrawal.
- Not to be done at expense or risk of smaller water users.
- This would be unfair as the small operator could not afford to do this.
- Still does not ensure everyone can afford a drink.
- May be relevant to a few specific situations.
- This means lots of wasted Water.
- Water should be reused and purified, not put into the ground. Do the oil, mineral; gas companies have to submit reports to the government regarding groundwater whereabouts?
- Water is too important to be controlled by private companies.
- This sets companies up to profit from water shortages and resale of a public good at exhorbitant prices.
- The rich companies will take more than their share in the end.
- It depends on what kind of storage.

Red Deer and south

- Limited and off stream only. Must not wipe out high flows needed for aquatic and riparian ecosystems. Do not allow for storage of all high flows.
- I'm not in favour of large (multinational?) companies banking water yet farmers and small agricultural companies do it all the time.
- Where high flows are natural, let them be. They are necessary for riparian health in many ecosystems.
- Oil and gas should not get to use potable water for injection.
- No privatization of water management.
- A full study should be done on each proposal for water storage to make sure no harm can result.
- This option is available in circumstances where it would be appropriate.
- This includes irrigation districts. Farmers should pay for all their infrastructure as well as operations. Then we will see rapid conversion to valuable crops, instead of still growing wheat and hay.
- Corporations should not be priority users, citizens should be.

did not indicate location

- No water available.
- Need an overall provincial plan. Water is a most precious resource.

Add your own example...

north of Red Deer

- If companies need fresh river water, then pay for it and limit the amount being taken not to damage the ecosystems.
- On any given watershed, stop development. Growth before a water crisis forces costly fixes.
- Older industries may be very wasteful - they should have to meet new consumption standards rather than continue with wasteful practices.
- Haven't we created enough damage already leave the damned rivers alone.
- Encourage more efficient use of water by metering usage.
- All users have water supply for a year. Take water during spring run-off and store.
- Encourage development of natural water retention (i.e. Beaver Dams in unpopulated areas).
- Develop new technology for desalinization of sea water.

- Companies must use salt water and leave fresh water for human consumption.
- Same as above - governments but work together - industry is a big user of water.
- The water strategy for Alberta should focus on the needs of the people. The government seems to be too much concerned with economic development. Look after the people and protect and manage the resources to the benefit of the people. Growth at any price is not a goal of citizens, quality of life is!
- Priorities: municipal, private water, agricultural, commercial, industrial.
- Encourage more efficient use of water through pricing to reduce overall use stipulating that municipal users would have a higher priority than industrial, commercial use.
- Corporate Alberta has to take on social responsibility. Maximizing profits does not promote sustainability. There are plenty of good examples of the "right things" being done (i.e. IKEA).
- Wisen up golf course operations. They're tremendously frivolous water wastes.
- Develop crops and industries that require little water.
- Do not fully allocate rivers - we cannot manage on such a fine scale.
- Governments take the responsibility for water. Water and Health are similar.
- Investigation of water collection (e.g. rainfall) systems.
- Encourage construction and use of small dugouts. Dugouts will catch and store rain water.
- Go small scale and construct weirs in rivers as opposed to huge dams. The rivers could flow naturally at all times. Reservoirs used by wildlife and for recreation. Don't allow building on flood plains.
- Re-examine the huge agricultural drainage projects and their effect on groundwater recharge. Some may be economically reversed to benefit the greater good.
- Do not supply U.S. with water.
- Do not sell water.
- Companies should use groundwater at all times and save our tapped water at their own expense.
- Enhance or re-develop existing natural water systems (dried up creeks, etc.) to re-establish aquatic systems Probably not much information on the costs, feasibility, etc. on this.
- Does this mean big oil companies who have money invested will use for injection for oil and gas recovery, no way.
- We need natural storage valued and retained on the land base, it's cheap and sustainable.
- Put a moratorium on factory farms or "CFOs" until we know precisely how much water we have. There is a perceived risk to present users by factory farms.
- Investigate construction of storage reservoirs to capture water during high flow times to meet any needs during low flows.
- This is misleading, flawed logic. These three factors cannot be balanced. The limits must be established for what is a healthy environment. Then that sets the limits (recognizing some technological improvements through time) to economic growth. At that stage of planning you must achieve a sustained, stable-state (or declining) economy or environmental health deteriorates. Social well-being can continue to improve with a stable healthy environment and a sustained, steady-state economy.
- Maintain existing wetlands for storage.
- The ideas group objectives said nothing about the constraints being important objectives of a water strategy. False! The ideas group correctly spoke/wrote about a sustainable economy NOT a continually growing economy. Don't twist their ideas to support your flawed continuous growth goals.
- This is not true! New licenses have been issued within the past year for "traditional" uses on known over-allocated rivers e.g. the Vermilion River. In the early 1990s, the Vermilion River was shown to be over-allocated. Surely others are in the same sorry state. This is not a future problem. It is a present problem!!
- Maintain natural storage on the land base (e.g. wetlands). These are in place and cost no money to build or maintain and release water slowly.
- Preservation of watershed is of utmost importance. Skiing, clear cutting of forested areas is affecting water supplies.
- Aquatic ecosystems including riparian habitat and health of wetlands must always be considered first. This does not happen now!
- Ensure that all water quantity allocations are in balance with the needs of the whole ecosystem (water-soil-plants-animals-people). Requires holistic planning and decision making.

- Encourage more efficient use of water through environmentally friendly land use practices. Communities, industry and provincial government would cost share awareness, education, tools and enforcement.
- Pump water from underground aquifers into lakes which are low due to drought. Considering the high volume of water that is lost into the ground around these lakes, and into the atmosphere due to evaporation, this is a very inefficient system. The primary advantage is political gain to local politicians from the cottage owners on these lakes.
- Water should never be over allocated.
- Companies should be allowed water for processing and they should have to recycle it so that they would not require additional water. Not a flow through system. They would need to purify their own water.
- Cities could "bank" runoff for their security. Air - water transfer developed in Edmonton.
- Ways we use water. New uses for electricity going away from hydro: sun, wind, NRG.
- Oil and gas, pulp and paper and extensive livestock should be charged for water.
- Does industry oil and gas conserve their water?
- Oil companies should pay the province for the amount of groundwater that they are using as it is the property of the government. May reduce the amount of water oil companies would use if they had to actually pay for it. May promote more study into other options of water used by the oil industry.
- Industry must learn to use alternate methods than water for use in such things as the oil industry.
- Water that has been polluted by industry and deep well injected should be recovered and cleaned so it can be reused instead of lost.
- Development only to a level sustainable by water resources in natural system.
- Promote water conservation measure at every opportunity. Allocating by "first in time" means a wasteful user can continue. Allocating by "value" means that industrial products could be made while people go thirsty. Design social and economic activities to fit the water available, not the other way around. (i.e building code changed to save water; prohibit the use of potable water in well injection; price water on an INCREASING scale for increasing use while making sure that ALL people have access to sufficient water for basic health and hygiene (approximately 50L per person per day is a widely agreed-upon figure). Three of the above items are deeply disturbing and suggest a profound ignorance of ecology on the part of the "ideas" generators. First, the thought that in the event of complete surface allocation we should measure the groundwater (presumably to divide up among users) suggests that the solution of using up one source is to use up another source. This has long been the management principle of this province and the world. It is time to live within our means.
- Keep our landscape as natural as possible. Protect wetlands and enforce protection.
- Decisions about allocation should be based on ecology first, economic last.
- No potable water should be used where we cannot retrieve it back into the water cycle.
- Our government should build water storage and charge users to recover costs.
- Transfer of water from basin to basin where water is needed, providing that the intake water be decontaminated at the intake.
- Meters for industry.
- Adopt recommendations of Beaver River basin study. Pay for water.
- Alberta Environment cares for and protects the aquatic environment?
- Government invest in research to reduce water consumption.
- Eliminate declining rate structure to encourage conservation by high volume users.
- Encourage efficient water use for all users by providing water priority via most efficient operation (shows improvement by reducing water use through technology).
- Ecosystem needs must come before all other users.
- Stop government subsidy of inefficient uses of water.
- Maintain storage in the form of wetlands that have natural basins with either no or some outflow.
- Diverting water to the U.S.
- Water Resources to not have a sell-out perspective. The so-called resource cannot be based on estimated allocations - you cannot predict weather and climate that accurately.
- Charge companies for water that will not be recovered (i.e. pumped down wells). For water that is gone forever – charge the hell out of these companies and limit their use.

- Organic farming may not need as much water, which our government may want to support.
- Water is currently licensed to quantity available during average year. Excess water in wet years is lost unless captured. Explore potential for purchasing rights to water owned by Saskatchewan.
- Agriculture (irrigation) consumes 80% of flow in major streams. A reduction of 10% in irrigation requirements would double supplies available for all other uses. More efficient irrigation practices should be explored.
- There is a limit to growth.
- Prevent water from being sold out of Canada. Free Trade Agreement stupidly includes water resources.
- Old fashioned rain barrel, cisterns. Every gardener has several out catching rain water. If that's not true, it's because city water is too cheap.
- Educate citizens about watershed operations.
- Explore conservation practices. If you have to farm in the dry belt, find an alternate crop that doesn't rely on irrigation. Stop letting farmers irrigate in the heat and wind of mid-day to lessen losses from evaporation. Encourage alternatives to high input grass lawns in urban parks and private yards. Make everyone install low flow toilets, showers, etc. My point being that there are many ways to reduce our consumption without affecting our quality of life. Farmers, industry and individuals can all make a difference learning to use what we have rather than incurring expensive costs either economical or ecological when trying to find new sources. Waste not, want not.
- Encourage northern development. Discourage southern development.
- Do not allow development if water supplies do not exist.
- Perhaps the industries that do not have area or facilities to store water could contribute to a fund that would install spreader dams and adjacent ponds on existing feeder streams to maintain an even flow of water in our main arteries.
- Industry should "never" be allowed to interrupt the land flow on stream banks, when taking water from or putting it back into a stream.
- Re-assess how we use water, especially in irrigation. Can we plant crops less reliant on water in irrigation zones? Shift agricultural practices of farmers – requires more creativity.
- Put water meters on all households and industrial/agricultural users. Provide consumers tangible evidence of their water consumption.
- No water transfers. No mixing waters from one basin to another as one group of people along one basin might be more responsible than another group from another area and this could contaminate the water.
- Industrial use should be limited (e.g. oil field flooding).
- Irrigation rights before domestic needs.
- If you price water the heavy users like oil companies have lots of money (so the public will lose).
- Build small local reservoirs to store water for use during dry periods.
- Minimize environmental impact and creation of micro climates around large reservoirs - reduces high flows and may increase low period flows.
- Maintain natural wetlands for water storage and groundwater recharge.
- Companies must develop recovery system that doesn't require the use of potable water.
- Encourage industrial growth in the northern portion of the province where there is a more adequate water supply. Then ship finished product south rather than raw product.
- Encourage industrial development in areas of the province that have adequate water supplies. Permits economic development in a sustainable manner without putting pressure on water sources in the highly developed parts of the province that may already be over-subscribed.
- Accurately inventory surface and groundwater and ensure supplies for aquatic system and jurisdictional agreements, plus a buffer for global warming. Allocate supplies for municipal and private domestic use. Review current water allocation licenses and ensure wise use and real demand instead of irresponsible licensing over past 30 years. Reallocate surplus to most beneficial industries.
- Storage facilities and small diversions, closed if possible are definitely going to be required in areas where large population growth is likely to occur.
- Return diverted water flows in northeastern Alberta to their original patterns, as before 1977. Return lakes and wetlands to their average historical levels as a requirement of sustaining the social fabric of regions.

- Domestic water use should have priority.
- Acknowledge that certain areas of the province are not suitable for high water using activities (i.e. irrigation - for example the special areas). Currently water is not yet considered a constraint. We will just build another pipeline or diversion and get more, this attitude needs to change.
- The practice of pumping fresh water into the ground to heighten their recovery of energy resources, resulting in permanent fresh water loss. Water that is already contaminated for human consumption should be used for these purposes rather than fresh water.
- Determine which aquatic species "plant and animal" would be at risk from full allocation of water resources.
- Allocate water to the needs of the aquatic ecosystems first.
- Development and industry are restricted to existing water supply. Prevents the massive draining of water basins to a certain area. Spreads the jobs and people out over the entire province.
- We need to find out why our water is under so much pressure. Do we abuse our use (pumping fresh water down oil wells)? We need to conserve.
- Everyone be encouraged to conserve water through economic incentives.
- Maintenance of a healthy water cycle including surface, atmospheric and groundwater should be the highest priority for sustaining human health and economic growth.
- Encourage private companies to develop water storage and charge users a fee to store their water allocation.
- Limit economic expansion in areas of low water availability. The Palliser Triangle is semi-arid desert and should Not be further developed.
- Create live computer groundwater optimization models. If possible have them internet accessible to consultants and public. Requires the combining/interpretation of water well information with seismic drill data, oilfield log data and most importantly groundwater reports "consultant and government studies" to improve on the old Alberta Research Council hydro-geological reports.
- Encourage groundwater research to acquire more knowledge of the groundwater aquifers and their flow systems and their linkages with surface water bodies. The water well industry drills to the first significant aquifer, and usually don't penetrate the entire zone or lower zones. The government in the past did considerable groundwater exploration that explored benefitted the well drilling industry, the rural population and our understanding of the aquifer systems. Groundwater inventory exploration is expensive, up to $10,000 per hole.
- Place restrictions on development in arid areas.
- Paying for water makes it a commodity. Under NAFTA, the U.S. can then buy it.
- Make sure that "value" is not only immediate economic value. Look at all implications of various water uses, including non-use, before making any irreversible decisions.
- More thorough and independent evaluation of water supply in high use areas.
- During times of extreme dryness in an area, industrial use of water should be discontinued.
- Give everyone the same amount of water. They will be responsible for managing it. If they cannot manage their portion, it will be their responsibility to maintain the business. Why should everyone suffer because others are not responsible? It may open a whole new industry for water management that could be sold to other countries.
- Encourage water conservation through education and financial incentives to individuals. Efficient use and conservation of existing supply is the first logical step.
- Develop a trading or free market system for agricultural and industrial water allocation. Free market pricing will ensure highest value use of water and stimulate water conservation.
- International sale of water
- Closed or open diversions of water systems should not be encouraged as the effects on the primary sources are not known. We should lie within our own available water supply systems or move elsewhere.
- Require use of saline water from deep in earth oil recovery (not fresh water for oil recovery).
- Only allocate groundwater rights after detailed study of replenishment rate of aquifers.
- Investigate construction of off-stream storage for use in same river basin.
- Give primary concern to drinking water ecosystem maintenance over industry and agriculture.

- Investigate/address the reason that water shortages exist (e.g. global warming, inefficient and wasteful use of water, poor agricultural practices that necessitate irrigation etc.). Without addressing the underlying problem, more and more river basins will reach their allocation maximums.
- Limit growth to only that which does not put more pressure on all ecosystems (not just aquatic).
- Grow according to how much water the environment can supply.
- Force industry to prove they will not negatively impact the ecosystem when they apply for development or usage, rather than others saying they are effecting it negatively.
- Investigate possibility of weather modification (i.e. cloud seeding).
- Encourage wise use of water resources both for agriculture, residential and industrial uses.
- User pay system for industry regardless of how it is used or the economic value associated with use.
- Metering system with cost for over use or misuse for the public sector. Not to make profits but encourage conservation.
- Price water subject to its use: domestic, corporate, industrial.
- Employ metering for domestic, private, industrial uses and charge money accordingly.
- Encourage land use practices that are consistent with local conditions.
- Work pro-actively with existing license holders to reduce their water requirements.
- Companies are charged for the amount of water they use. Companies will use less water. Money from their fees will support more sustainable ways for people to farm and ranch with less water usage.
- Determine extent of groundwater pollution.
- Investigate how groundwater is being polluted.
- Determine how groundwater is being polluted.
- Investigate small off channel supply systems.
- Ensure all water supply projects report natural hydrology variability (e.g. through timed release).
- Storage of water in empty caverns (i.e. salt, coal, etc.)
- Eliminate high usages (intensive agriculture).
- Consider the limits to growth. Everything is finite including water.
- At times of high need allocate some portion of the water to domestic users even if junior license holders. Rationing should recognize domestic/agricultural need first over industrial needs.
- Decrease allocation to all users. Public uproar likely. Probably would cause economic slowdown, by affecting both industry, agriculture and quality of life.
- Regarding storage reservoirs, I favour off-stream storage over on-stream storage. The former has less impact on the existing aquatic ecosystem. Nevertheless, I am concerned that all reservoirs pose a health risk related to the release of contaminants from newly flooded soils.
- Encourage companies to recycle water in production systems. Cooling water and process water need to be retained prior to discharge: reused instead of discharged wherever possible.
- Refuse to permit development where water supplies would be put under pressure. If economic criteria are allowed to make decisions that affect the environment, environment will usually lose.
- Begin to balance water supply with current needs and reduce expansion if it will exceed current resources. Soon we in Alberta will be aware that the growth potential is being reduced as we consume all the resources. We need to develop sustainable and not expansionist policies.
- Understand that water has use not only for us or for our needs but for other living things too. Less water for the human population.
- Some land should not be cultivated therefore, water should not be allocated for irrigation. Increases soil erosion and is a misuse of water.
- Promote private ownership of water resources. *Owner*
- Investigate conservation and underground storage technologies as an alternative to surface storage reservoirs in dry areas - floating covers on irrigation reservoirs and ditches, geothermal cooling for industrial cooling applications.... also consider phasing out uses with alternatives (air cooling to replace water cooling) over a decade or so....Alberta industry and government has not been very creative in the past with conservation and optimization technology - new technologies and approaches could be commercialized internationally - a combination of incentives, regulations and research is needed. Could our cold climate be used to improve the quality of deep aquifer water that is too saline for use now,

through the freeze-thaw cycle - good enough for some industrial use and as water supply for feedlots? Are we using our best water for potable uses and minimizing the deterioration of water quality when it is used?

- Model the declining water supply due to climate change to determine whether growth in water use is even possible – may have less regardless of population or economical demand.
- Improve treatment of water returned to a watercourse after use. Costly to remove contaminants before water discharge.
- Encourage water conservation through incentive programs, (e.g. offer tax breaks to homeowners, businesses, municipalities who install the latest in water conservation technology; gray water systems, low flush toilets, or larger scale measures, etc.).
- Allocations must be market driven as to determine best use.
- Develop satellite (remote telemetry to access sensing) surface water (snow patch).
- Existing water licenses should be scrapped and a new allocation system created.
- Stockpiling water must be regulated and in proportion to volume available.
- Water storage requires security and standards. This should be initiated and implemented by who?
- Oil companies should be prohibited from using fresh water. They can use deeper salt water for their use, drill their own wells, etc.
- Recognize natural recharge and storage systems (e.g. wetlands) and utilize/restore them. Cheapest most effective and offer other benefits at same time. "It's hard to improve on mother nature."
- Make it mandatory to maintain lowland watersheds (e.g. muskeg land). Government tells landowner what they can or cannot do with their land.
- Create active monitoring do not depend on complaint driven enforcement.
- Recognize that sustainability and continued growth are not compatible. Accept natural limits and quit trying to exceed them.
- Irrigation builds and maintains dams and infrastructure.
- Water used for water flood should not be allowed to be sold to another company. It should revert to the government and people. The new company should apply on their own merit.

Red Deer and south

- First in water allotment may be a very inefficient method of distribution.
- Private companies and individuals should not profit by the sale or trade of water allotment by virtue of being in Alberta first.
- Encourage a decline in population and water use per capita. If individual water use is down but number of individuals up the net benefit is zero.
- Spend some time and money on alternate methods for industrial use. Maybe more efficient methods to get equivalent results.
- Prioritize water conservation methods that must be followed. Wasteful or heavy consumers should have to pay dearly for any consumption above and beyond basic needs. Instill in people the philosophy of water conservation always (e.g., do you really need to shower 2 or 3 times daily, or water your lawn excessively??).
- Consider feasibility of constructing (as many as possible) small reservoirs, stock watering dams, dugouts, etc. that have low impact on the environment. Beneficial to farmers, and earthworks can be used on road improvements.
- Natural storage systems (e.g. riparian systems and wetlands).
- Water not used in a license should be removed from the license. No benefit to license holder unless conservation measures (i.e. improved efficiencies) are made by license holder.
- Allocate water use to those users with greatest return flows. Least impact on environment, while increasing economic benefits.
- All water users develop conservation strategies. Up front cost could be large. Government could amortize the conservation costs.
- Replace the current river basin apportionment with a provincial policy which assigns the amount of water than can be consumed by each sub-basin.

- Water must be fairly distributed to all of Canada. No preferential treatment for the wealthy.
- The problem with all of the above is not only that they are not addressing the right solution (conservation/reduce use) but they may or may not work given the changes in evaporation, precipitation, hydrological changes that climate change may or not be best use bring. The least costly/best alternative is to make the best use of what nature/God gives us.
- Province buys back water rights in over allocated water basins and uses those rights to alleviate domestic water shortages and protect natural resources.
- Ban all motorized water craft from Alberta rivers.
- Restore riparian areas as they store water.
- No intervention transfers
- Pig operations use extreme amounts of water. Currently the rural residents' water supplies are sacrificed and will be more so in the future if the government does not address this issue. Instead of the appellants proving their water will be affected, these operations should be required to prove they will not harm other area users. Currently it is up to us to protect our water supply. This should be the government's responsibility.
- Restore and maintain natural storage - wetlands.
- Use wastewater to pump into well sites rather than clean and sometimes treated water. Saves cost of treatment and preserves supply of clean water. This option may cost for transportation but should be more environmentally friendly.
- Require all sources of waste to be treated if entering clean water supply, including intensive livestock operations. Not treating animal waste and allowing it to enter clean water supplies is not smart and very short sighted. Some Intensive livestock operations create more waste than cities the size of Red Deer.
- Maintain natural storage on the land base (e.g. wetlands). These are in place and cost no money to build or maintain.
- This question is totally inappropriate. "I'm telling you" the premier snapped after he got wind of what Mr. Taylor was up to later in the day. "If you want to create and environmental uproar in this province, go ahead with an inter-basin transfer program." The Edmonton Sun. march 1, 2002, Neil Waugh's column.
- Look at more environmentally realistic ways of water use - moving water from company to company to be used more than once.
- Water rights/permits should be a provincial resource much like oil and gas on private land. Private landowners with permits should not be able to make a profit from selling their permit at the expense of an entire community.
- First in time/first in right rule cannot be transferred from original owner to new owner.
- Water license transfers for those not using should be turned back to the province for allocation.
- Regulate the abandonment of wetlands.
- Must be prepared to look at individual and special cases for inter-basin transfer (i.e. regional water systems).
- Human consumption, no.
- Oil and gas industry should pay a higher price for water (i.e. water, flood, etc.).
- Consider efficiency of use in allocating water. An inefficient user, even if he is an 'older' user, may have to yield water rights to more efficient users.
- Disallow use of surface water for uses that would remove it from circulation. Oil companies would be prohibited from using surface water for water flooding oil reservoirs.
- Reduce the allotment agreement to Montana. The U.S. changes commitment to Alberta on a daily basis.
- Southern Alberta is a dry area. Do not increase allotment to southern Alberta for irrigation. To legislate and allocate water from a productive central Alberta area to a desert will fail in the end. Consider the costs. What is sustainable about that?
- Sell water to pay (U.S.) for programs/development.
- Alberta has 20 plus dams and major off-stream storage infrastructure, do we need more?
- More specific on who makes decisions and regulations regarding ecological impacts etc.
- Allocate water to users showing good conservation practices - limit water to wasters to a limit under which they could operate with improved practices.

- Population caps on municipalities that don't meet conservation or use targets.
- Allow small landowners to capture water at high flow times via their own ponds and tanks - with one restriction - that surrounding ecological area and neighbours without storage capability - are not deprived of natural flows and precipitation.
- Studies should be done about deepening parts of ecologically important shallow lakes, etc., so they will hold more water for wildlife and cattle through dry summers.
- Promote the efficient use of water incentives.
- Promote the recycling of water wherever possible with incentives.
- Must put water into an unbiased market. Farmers cry and vote against Klein but most benefit overall.
- Public education is needed to reduce water consumption by all users. Alberta government and municipalities are doing very little to educate the public at the moment.
- Facilitate economic endeavours that use water most efficiently.
- Yes, locate industries beside the water rather than divert water to the industry (e.g. establish such industries in the northern basins).
- Make sure water does not become vulnerable to acquisition by U.S.
- Subsurface storage in gravel close to water sources, if possible and feasible, would prevent disturbances of naturally flowing rivers.
- The ecologically and legally available water in the South Saskatchewan River basin should be auctioned off on a yearly basis. This would allow all current and potential users of the water equal access.
- Stop subsidizing irrigation infrastructure and agriculture generally.
- Human use rather than economic should be priority.
- Insist that new users (of diverted water) pay the total cost of infrastructure and water.
- Encourage more efficient water management by offering tax breaks. Companies should be rewarded for being more responsible with natural resources.
- Consider the carrying capacity of the region when calculating the "feasibility of options.
- Payment for water collected from ground and surface should not go to general provincial coffers but should be allocated to water conservation treatment and infrastructure.
- Improve management of watershed areas. Clear cut forestry reduces the capability of forests to absorb water when it is wet and release it when it is dry.
- Introduce incentives for more water-efficient operations.
- Build water pipelines using existing gas pipeline right of ways or other right of ways.
- Encourage the use of large scale rainwater catch meant for individuals and companies.
- Encourage xeriscaping on all public and private lands.
- Set licensing so all licenses, even old ones currently protected, receive "x%" of their license depending on water year. Initial license amount should be based on water availability in an average water year.
- Ban manmade lakes unless they use previously used water.
- Reforest/re-vegetate eastern slopes (and other watersheds).
- Review FITFIR rule. Older licenses should be re-appraised on their efficient use of water. If it is found to be inefficient, their allotment should be decreased.
- Allocate water based on a percentage of water available (total water - water required for ecosystem - water available.
- Watershed management approach must be implemented. Watersheds be managed by its residents as autonomous (?) bodies with the water act as its guiding force.
- Resolve not to export water.
- Place ecosystem health above economic as important – limited growth. We may have reached limits of sustainability already.
- Review current water licences, impose new maximums, if appropriate. Political risk, as established water users object/long-term planning impacted.
- Reliable reports show detrimental effect to the environment and economic well being of areas subjected to diversion of water.
- Remove subsidies from irrigation agriculture.

- Allocate water on a per person ratio. Keeping track of numbers will be costly.
- Large commercial agricultural operations must develop private water storage and recycling/reuse methods.
- Stimulate research and development of using CO2 as a replacement for industrial oil producers current enormous water demands.
- One must watch that this resource does not become a marketable resource. It has to be owned by all Albertans. If you want to know what not to do, look at Great Britain and their mess by privatization for household water.
- I understand that withdrawal permits have been issued with no volume restrictions - these permits need to be changed.
- As a city dweller we pay for access to treated water - what portion of that cost is for the water itself - perhaps all Albertans need to be aware of the value of water - often people need to pay for something before they appreciate its value.
- The health of aquatic ecosystems takes precedence over economic growth.
- Before any major decision is made - we need information.
- I think it may be time to re-examine the 1st in 1st right idea. Times change, things change.
- Government could loan/grant monies to all wishing to bank water in storage areas during peak water times.
- Restrict new water licences to those that supercede benchmark values for benefit/value or conservation. Encourages conservation amongst new licensees or existing licensees that wish to expand their operations.
- Restrict water licence transfers to licenses that supercede benchmark values for benefit/value or conservation. Encourages conservation, provides supply to junior licence holders that have demonstrated need/value for resource.
- Reservoirs to be constructed for water storage. Dams to be constructed to store heavy run-off. Water for use in dry cycles.
- Emphasis on price increase.
- Our location is in the Old Woman's Coulee Project.
- If regulated and does not impact ecosystem.
- Develop user friendly methods to allow for the exchange of data about water management and develop decision support tools that will help individuals, organizations, stakeholders and the government address water resource management issues. Unless there is a "quick" ability to have information about water quantity and/or quality and the necessary decision support tools to evaluate different methods of operating and their associated impacts it will be difficult to arrive at workable solutions and it will be more difficult to have active plans that change within agreed upon objectives as situations require.
- Un-develop riparian zones to allow natural flood routing to extend flow duration, filter the water and may be provide some flood reduction down stream.
- Investigate reservoirs in order to more effectively provide water for current users, not necessarily for new users. In many places where water shortages are common, the watershed is at or near full allocation. Need to manage for times of drought.
- Construct off stream storage.
- Limit population and industrial growth in southern Alberta.
- Should not be allowed to transfer water from one parcel of land to another (e.g. irrigate parcel A this year move to parcel B next year then back to parcel A or to parcel C the next year).
- Moratorium on development of more CFOs in southern Alberta.
- Disallow further agricultural, residential or commercial development in areas that do not have sufficient water supply or potential for severe shortages.
- Consider value of food production versus other uses. Farm products seem inexpensive.
- Establish principles for irrigation versus municipal and industrial use. Can food production include costs of water?
- Water has already been over allocated. It has been estimated that Alberta alone will have 20 million people in 50 years.

- *Make industry and all users pay the real cost of water use and quality* (e.g. install outlets upstream of inlets to insure water quality). Maintains the quality of water for downstream users while making the user responsible for only their degradation.
- Questions are often complicated with several variables or qualifiers making it difficult to provide only one simple response e.g. storage for "new operators" or to "supplement low flows" for everyone.
- Limit growth.
- Limit growth, maintain what we have.
- Accept that water supply will limit growth in some areas.
- Allow river and stream operation in natural state.
- Identify barriers to reallocating water to most valuable use (e.g. government subsidies to certain sectors).
- Reduce, reuse, recycle - companies should clean their wastewater and reuse it.
- Water to be used for export to U.S.
- Investigate and determine today's baselines on "each" basin from watershed to end jurisdiction for lateral comparison data then basin to basin.
- Industry to be licensed on efficiency and quality as well as quantity used.
- Provide incentives for current license holders to reduce water use.
- Increased recycling in industrial, municipal plants.
- Regulate or limit golf course use in dry times.
- Rivers are destroyed when man moves their paths. Do we have the right to mess with mother nature?
- Companies pay based on amount of water that is not retrievable. A farmer waters a crop and water goes to water table. Water injection wells pump it away. Gas prices go up everywhere.
- This is happening now. I totally agree with this process providing it does not place additional risk to other users. This is simply good management.
- Put Albertans first. Water presently being distributed to Montana and Saskatchewan should go to the back burner until needs have been met in Alberta. Economically this may be detrimental but will see that the needs of Albertans are met prior to sending the water outside the province.
- Generate power with water - Kyoto approves Quebec's water power generation as clean?
- Build dams to control flood water and provide water in low flows.
- Find better ways to use the resources we have.
- Build wetlands to store water for later use.
- Government education campaign through communication media, elementary schools, etc. To instruct people how to minimize their consumption. North Americans in general are water hogs; and provide incentives to those individuals who comply.
- Companies must build and pay for all systems as well as water consumption and the cost to the general public. We suffer and profit margins of corporations increase.
- Junior water licenses are told up front, last on, first off in drought conditions. They want to share with senior water licenses, which is unfair to senior licenses.
- Recognize limitation of supply and focus on controlling demand for water. Requires pricing and increased efficiency.
- Do a massive amount of education about ways to save water, legislate the use of water saving devices in homes. Make companies/industries look at ways to be as water efficient as possible. Usually this results in a financial savings as well (especially if you raise the cost of water to reflect its true value). There are countless ways to save water (and energy) that are not being done today. They could free up a great deal of water.
- Encourage more efficient use of water glow pressure pivots instead of wheel lines or flood irrigation and recycling of water.
- In years of shortage, all users should get the same percent of their licensed amount as has been done in the St. Mary basin in 2001 and 2002.
- Province should boil water for existing users.
- Limit development of residential and commercial uses based on water availability projections.
- Establish wastewater treatment criteria so applicants don't contaminate surface and groundwater.

- Work with and encourage users to seek innovative means of capturing rainwater (recycling waste/grey water, etc.) as an alternative source of water, thereby minimizing impacts to traditional sources. Initial costs may be high but the overall savings in efficiencies and minimal impact to aquatic systems will be invaluable.
- Review allocation on a regular basis to determine need and change if necessary. Use changes over time, a license for a purpose that no longer exists is wrong.
- Encourage agriculture producers to store run-off by building lined storage reservoirs and dugouts.
- Renegotiate the appropriate agreement with Saskatchewan. Our population growth has been much greater than theirs and we have picked up many of their former residents. Logically, therefore, our share of the water should increase.
- The premise of this section is that we must somehow locate and exploit all available water to protect economic activity and development. The resource is obviously finite so we need to tailor activity to water, not the reverse. High water tables, underground streams, etc. are not a wasted resource.
- Continue to encourage water conservation by using meters, pipelines, closed irrigation systems.
- Encourage monitoring water use in irrigation systems so little if any water is run over end of system.
- Stop farmers from dumping massive amounts of water on crops that aren't worth anything.
- Protect the aquatic environment first.
- Require water meters to be installed on all new developments. Also require water meters on all previous constructions within five years of implementation of the legislation.
- Expensive to implement and enforce and would encourage water conservation if you knew how much you used and had to pay according to volume.
- Increase enforcement of water issues such as the amount of water oil and gas industry uses. They are always over what they are allowed.
- Alberta being on the Eastern Slopes of the Rocky Mountains has the best location to capture and retain/store an abundance of water for all uses in Alberta. This must be done! Currently allocations are the same as rationing which we should never have to have in place.
- Shortage in southern Alberta is a indication that the region is at or beyond carrying capacity and at the limit of use. Strategy in southern Alberta should be focused on water-use efficiency and not further growth and expansion.
- Dams for electric power.
- Investigate diversion of water from northern basins to closed storage reservoirs in the south and increase the capacity of off river storage in the south.

did not indicate location

- Advanced participation in irrigation rehab program to expedite completion.
- Diverting water from one river to another to have more water flow in arid regions.
- Build a large dam in the badlands east of Drumheller to provide electricity from water instead of using fossil fuels.
- Water allocation must be considered by priority with #1 priority being essential human/environmental needs especially in years of drought (i.e. allocating water to a golf course or some other "luxury" industry or usage is not a human/environmental necessity and should have minimal priority/allocation rights in years of drought).
- Should water license holders be able to transfer their water allotment (not the license itself) on a temporary basis.
- Allow municipalities to store excess water for public interest.
- Investigate reversing of some of the previous drainage projects for economic value versus groundwater recharge.
- Do not fully allocate surface water.
- Water shortage brings down systems and governments. Efficiency – not the answer. Do not use to produce oil and do not pollute.
- I do agree to companies constructing some sort of tank or rain catching receptacle next to their buildings. Do not involve rivers (e.g. Mountain Equipment Co-op).

- Bad police will help control the poor so we can get rich.
- We should not sell water to other countries.
- When water is used for profit there should be a charge for irrigation.
- Any idea which comes out of idiot L. Taylor's head.
- Investigate options other than reservoirs and diversion schemes so that Alberta's water use becomes more economically sound.
- Promote water conservation through natural means (e.g. maintaining natural storage on the land base-wetlands). These already exist and cost nothing.
- Review problems already obvious with numerous storage reservoirs on basins.
- Review the total economic costs of water diversion transfer in terms of future generations – not immediate corporate.
- Investigate and fund reduction of water use through home water conservation and lower use for industry.
- Adopt strategies to change water usage culture to conservation approach involve public provide financial incentives to reduce water usage.
- Agricultural and industrial users should pay municipal water rates per gallon of water used. There is no downside to this.....people come first! To hell with greedy farmers, ranchers, and industrial exploiters.
- Water license conditions enforced.

water conservation

11. Please review the following list of options for conserving Alberta's water. Indicate the extent to which you agree or disagree with each option.

Respondents commented on options presented in question 11 and also provided their own examples.

a. Establish a price for water used by industrial and agricultural operations.

north of Red Deer

- Price should reflect the true total cost e.g. irrigation water cost should reflect the costs of dams, infrastructure and pumping.
- Depends on which type of operations. Information, knowledge, skills training, incentives, rationing, rewards and other methods also stimulate wise use.
- Industry using water and not reusing.
- I think this is a good idea. My only concern is for people who can't afford this but if you are making a livelihood and only by doing it unsustainably – you shouldn't be doing it or make changes.
- Give industries/farmers/municipalities a 'tax-rebate' for reaching a 'low amount' of pollution. Incentive will strive people to lower pollution if incentive is worthwhile.
- Industrial – charge them on volume. Agriculture – flat rate – eco-fee.
- May increase costs to taxpayers?
- I do not believe that family far type agriculture operations should be charged for water use, but corporate farms, irrigation farms and industrial operations should be.
- If water is sold it becomes a commodity and U.S. will demand access to our limited water supply and buy it with their inflated dollars.
- I don't want to see this become a commodity under NAFTA and commit us to selling water to the U.S.
- The establishment of a price for water used from our rivers or our groundwater is a very bad idea. It is another way for the government to just take money from the public to try to fund its projects. There will never be a fair way to put a value on our water nor will the money taken for our water be used 100% on water conservation.
- Water is not for sale

- I agreed with full cost pricing, provided that low income users still have access to water and that citizens have access to water for basic needs.
- It is not a commodity. It is a provincial resource we allow a user to utilize.
- The rich will only benefit.
- Should not be able to transfer or purchase water for a lower value land use.

Red Deer and south

- The price for using water should be connected to the cost of reclamation and reuse.
- What's next? Air?
- Oil field injection water is not renewable water. Agricultural water all is recoverable.
- As long as this doesn't put business out of business. Possibly establish what quantity of water they need, monitor their water use and charge for water use above required amount, etc.
- If the incentive results in better conservation of water by these users.
- I am very concerned about the consequences of putting a price on water and thus moving it into the realm of tradeable commodity. Some of the implications of that may overshadow the way a price could function as a conservation incentive.
- These represent the largest users, thus the greatest opportunity to save water.
- Once prices are established our resource may become a part of free trade.
- Will encourage drip irrigation.
- Totally opposed to putting a price on water. These questions misleading - neglects to mention that although operators do not actually pay for water from source points, it fails to list any associated costs of putting a system in place. Establishing and maintaining a good water supply currently costs industrial, municipal, agricultural and individual households a substantial amount of money. We already have a license system in place, perhaps the license system needs to be reviewed and revised.
- Pricing should be introduced to encourage conservation; it should not be equated to resource ownership and should not determine who gets the water.
- Include oil and gas, coal and ILOs - for large industry, not farming.

did not indicate location

- This question is not truly representative of the problem.
- Price is still paid for by the end user.
- These revenues go to cleanup and mitigation of industrial pollution.
- But urban users also need to be charged.
- Water and air are free by God.
- A price, but in conjunction with wise conservation measures (i.e. not irrigating at high noon).

b. Establish a price for water used by individual households.

north of Red Deer

- An additional charge for water extracted could kill small municipalities or at least prevent growth because of costs.
- Why the emphasis on pricing water? We basically need water to live. We optionally can allocate water to businesses for them to make a profit from it - they could pay and probably should pay for it.
- Households use less water than industry, and can conserve water less expensively.
- We all pay a flat rate fee for basic amount of water in town. Then pay extra if we go over that quantity.
- Do not allow individuals to withdraw untreated water in municipalities.
- How could you, without total control?
- Also a concern is having the 'market' manage water – it's a hard thing to put a price on, could be dangerous.

- Determine the impact of dams and reservoirs on down and upstream habitat equation, riparian and land basin. Increase understanding, lending to more educated decisions.
- Municipality should charge realistic fee for delivery so users save money if they save water.
- Only price for water delivery.
- We should look at ways to award people and companies for smart water conservation practices and provide technical help to those wishing to try to reduce water usage, rather than just charge them for the use and then use the money collected for conservation projects.
- Should be metered and fee paid for delivery of it? Not for water itself.
- A "pump tax" or "pump surcharge" could be charged according to the amount of water used. This money could be used for conserving aquatic systems, improving technology, etc.
- Water is not a commodity for sale.
- Water is a right, not a commodity.
- Metering should be mandatory and households should be aware of the costs of water use. Low-income households must still have access to water for basic needs.
- But I do think municipalities should meter water and charge accordingly
- Large heavy – not small operators.

Red Deer and south

- Establish a minimum amount and then have a charge for the additional amount.
- Establish a base minimum and then significantly increase the price for using more.
- Alberta's water belongs to Albertans. Some of that resource belongs to my family. It is difficult to imagine paying for what we now have freely. Who would we pay? The government? One more form of taxation!
- This presently done by some municipalities. Charging them could make more of them charge each household, business, etc.
- I am very concerned about the consequences of putting a price on water and thus moving it into the realm of tradeable commodity. Some of the implications of that may overshadow the way a price could function as a conservation incentive.
- Already have incentive to conserve.
- We must hit people in their pocket to facilitate understanding of true cost of water!
- In a rural environment monitoring water use, like monitoring utilities, would be excessive.
- Water is a right and growth is limited by supply.
- Pricing water breeds concerns re NAFTA.
- Over a certain threshold, perhaps.
- Households should have minimum or standard entitlements to basic water needs without charge. Water is a public resource. Corporations do not have such inherent rights and should pay, as large users, for what they use. Companies do not need to live and drink; nor do they have the rights of citizens.
- No more flat rates.

did not indicate location

- These revenues go to water management and plans and projects.
- We are already paying but oil companies don't.
- Unsure for private well, etc. Not through our taxes/water bills (for city/town dwellers)?
- Small farmers should not have to pay for water from their own wells.

c. Educate Albertans about water conservation values and methods.

north of Red Deer

- Very important that people know and are aware of the issue and how and why it is important to conserve water.

- Absolutely – need to educate Alberta about the value of water.
- Promote water conservation in cities and towns. Decrease watering of lawns and golf courses. Subsidize drought resistant lawn grasses.
- By water conservation I mean wise use and reducing consumption, not the government's Orwellian definition.
- Most important.

Red Deer and south

- This is voluntary and only works with those who share the ethic. Would need to integrate with economic and regulatory incentives.
- Is paramount and should be a priority.

did not indicate location

- No. 1 priority!
- Supply adequate personal use.

d. Establish water conservation incentives (e.g. tax rebates) offered by government.

north of Red Deer

- Why? Give back, reduce the tax, the party pays.
- Grants for water conservation technology.
- Very difficult to establish.
- You need incentive especially at the start of something to make the right changes.
- Don't understand how this would cost taxpayer.
- Not if taxes go to water availability research.
- Probably not required if cost of water is high enough.
- There should be a balance. We all benefit and I am willing to pay a little extra.
- Economic incentives like paying for technology upgrades should be used to the point where they are cost effective.
- Reward those individuals who conserve - not necessarily industry as they already get breaks.
- This is not equitable for low income.
- As long as benefits far outweigh the bureaucratic cost.
- Why not pay farmers not to grow crops ... sounds familiar!

Red Deer and south

- Great if there is a social/ecological benefit.
- A province-wide forced conservation? Northern Alberta has more water than southern Alberta - how does that work?
- Could set example and goal for other users.
- Need more innovative ways to prevent undue costs to taxpayers. The "user pay" principle can be applied in many cases (e.g. reducing ??, education). Taxpayer can only afford so much.
- Very complex to administer.
- Would cost more to implement than would benefit. Resources would be better spent on education and infrastructure.
- Negative impact on deregulation.
- In exchange for top tax breaks on conservation, investments, the government should get a share of the water saved. This should be added to the IFN, giving a net gain to both farmers and field.

did not indicate location

- Incentives can be non-monetary.
- Quit griping for more taxes.
- Encourage business to sell appliances, etc., that conserve water (dishwashers, washers, bathroom faucets, etc.).

e. Set targets for water conservation for various sectors using best management practices.

north of Red Deer

- To be done at the local level with government input, ways of enforcement and management.
- NAFTA guidelines. Risks if viewed as commodity. Charge for infrastructure transportation but not for water.
- Require water metering on all municipal systems.
- Targets are useful but they may be insufficient. Mandatory standards may become necessary.

Red Deer and south

- Make the violation of such standards expensive.
- Meeting targets should be mandatory not just "guidelines."
- Good idea for guidance but difficult to administer.
- Severely limit intensive livestock operations.
- Would depend greatly on the industry, water use and cost.
- No potable water pumped into oil and gas wells!
- Require metre's in major communities.

did not indicate location

- Water for food production should have priority.
- Not so difficult if there is political will.
- Some of these adversely affect habitat.
- All sectors need to set targets.
- Brake the water of life freely.

Add your own example...

north of Red Deer

- We must ensure that any targets set are strictly adhered to. Industry must not be able to say they need a few more months or years. If we want to make changes and protect the environment we must not be allowed to flip flop on deadlines, government must stand firm.
- Establish higher prices for higher volumes.
- Promote energy conservation, and stop sales of electrical energy to the U.S. where it harms our environment to produce it. Thermal power generation is a huge consumer of water. Energy conservation measures are easily attainable (we are incredibly wasteful!).
- Price water on an increasing scale, the more you use, the more you pay per litre (where the basic health/hygiene amount of 50L/person/day is free). There is a DIS-incentive to conserve water with present decreasing or non-existent rates for increasing use.
- Do not allow for volume discount pricing.
- Discourage residential and industrial expansion in areas with low water resources.
- Fund research and development into alternative agricultural, industrial practices/technologies.

- Potable water is a very valuable resource and like all resources should be paid for. The price should vary according to the quality of the water used. Example: the cost of destroying potable water should be much more for the oil industry than for cattle, livestock and agriculture.
- It is unwise to allow oil industry to destroy potable water to extract oil out of the ground when non-potable water could be used instead.
- Conserve rain water.
- Rebates on minimal use of water.
- I think in the future, industries should be shut down [rather than?] price water. The government to supply for agricultural use so that we have food and water to survive or that we can live on earth without too much sacrifice for being here. This would probably wipe out [the] population. As for cost, the government should lower some tax cost.
- Set household water limits (per individual/per household). If limit is gone over then charge the household for extra water use. Promotes conservation but ensures necessities of life for poorer families.
- Market gardens using multi lake and river water at no cost (disagree).
- Lake owners using multi-water for lawns (disagree).
- Consider water reuse options.
- Require water meters on all homes in Alberta.
- Eliminate water wasters.
- Natural and ecological uses of water should not cost anyone, and quality needs to be safeguarded.
- Promote retention of forest cover in agricultural areas to maintain groundwater.
- Provide incentives (tax credits) for landowners to re-establish or maintain forest cover in water course areas.
- Improved monitoring of water across small and large scales. From watersheds to the province. Better information allows for more precise management.
- Establish means to prevent permanent loss of usable water such as into deep well injections.
- Establish a price for water used by industrial and agricultural operations and household use only if water basin is used to full capacity. Charge a fee for the removal of water from a water basin if all water is accounted for. Abundant water basins that are not being used to full extent should not be charged a fee.
- Promotion of organic farming because organic farming uses less water.
- Do not license inefficient uses.
- Try to create a 'trend' using media, etc., for people to conserve water. Trends come in and out but recycling started off as being trendy and it's still happening. I believe water conservation will come with using a combination of all these options. Maybe strive for all methods except adding a ?? to see what happens, and tell people if we can't conserve water you will be charged for it.
- Prevent private sector monopolies like EPCOR from artificially driving up costs without contributing to conservation efforts.
- EPCOR, an unfairly publicly funded private company would have to practice business fairly instead of screwing the Province, ratepayers and taxpayers in Alberta.
- This booklet, information, questionnaire could be just the thing to educate us regarding water use, need to give water the respect it deserves, instill in us more responsibility regarding how we use water. I have morals. I don't even water my lawn if there is a hint of a water shortage on the way or in progress.
- Stop use of water in oil/gas extraction.
- The pricing should cover costs and a percent going to emergency storage and keeping feeder streams running as long as possible in a year by astute placing of spreader dams and encouraging contact adjacent ponding. Number 2 is very important and is the "key" to the whole system of stable water and habitat.
- There is a limit to the amount of water to be taken and a price after excess.
- Challenge municipalities to conserve set amounts of water. Targets based on past use and take into consideration population growth.
- Allow quotas for water use depending on household size. After quota is reached, a fee takes effect.
- Motherhood and apple pie.
- Focus efforts on industrial usage.

- Assist water conservation workshops.
- Investigate water saving devices.
- Oil companies should be using every effort or new technology to reduce the practice of exchanging good clean water for oil. Once its gone, it's gone off the plant.
- It would have helped if I understood what the breakdown of costs for municipal water supplies (province, municipal and taxpayer). 11.6 Water pricing has a global implication in economic markets, it's a more complicated issue than presented. 10.3 Allocate based on most beneficial use, by who's standard? Interesting that the issue of sharing resolved itself with the people directly involved understanding the inter-connectiveness of the users in the community, may be the model.
- Set binding plebiscite to get feedback, as the politicians don't seem to be listening anymore in this province.
- Legislate installation of low water use devices in all new construction and promote retrofitting of low water use devices through a grant program.
- Cost of installing meters and appropriate billing systems. Plus is that data availability goes up and use and unaccounted for water goes down.
- Require water metering and progressive rate structures to encourage lower water use.
- There is a cost but water savings generally pay for themselves. Municipalities or water companies that are operating the systems will have lower revenues that may hurt profitability initially, but deferred capital expenditures will more than offset the cost over time allowing full operating cost recovery when appropriate rates are applied.
- Did the federal CHOP program work in the long-term to decrease fuel consumption? If yes, then something similar for water could be a benefit.
- There will never be a charge for maintaining the natural wetland environment
- Industry has to develop sustainable methods and pursue new technology, as that doesn't require water. Many counties have developed technologies in areas where water is scarce! No price on water.
- Negative incentives for misuse (i.e. notable to receive government grants/contracts/funding)?
- Agriculture has no way to recover extra cost to buy water.
- Act now to reduce global warming.
- Get an Environmental Minister that does more than appear in tax paid Eco-Ads while supporting the petroleum industry.
- Do taxpayers or users (farmers) pay for irrigation infrastructure? Are irrigation farms beneficial to economy if all costs are considered?
- Ensure all Calgarians have water meters!
- Restrict industrial growth in the province. The more industrial growth there is, the more immigration to the province there is both of which put increased demands on our resources, including water. We need to lower the population and industrial growth of the province, not raise it.
- Restriction/prevention of further industrial growth is essential. Without restriction/prevention of further industrial growth there will always be an increased demand on water and other natural resources. Continued growth will continually put an increased demand on water and other natural resources with the loser being the resource and the people who appreciate them for what they are now, not for their economic value.
- Set water usage caps on certain industries for withdrawing water (e.g. golf courses) in drier regions with limited water supplies.
- Do not think about charging those who raise livestock for the water we use. We live off the land and have been conserving and caring for the land for generations by being responsible enough to keep our livestock away from waterways. We should then not be penalized for using groundwater. We were monitoring and conserving long before it was deemed necessary. I have seen much more water wasted by town, city, residential persons than a farmer would ever dream of. Start there. Do you realize what a golf course or recreational area uses?
- Expansion of certain industries can be inappropriate in drier regions with limited water supplies.
- Are homebuilders promoting use of water saving plumbing fixtures and appliances?
- Major public awareness campaigns to provide information on the values of water conservation.

- A change in lifestyle may be required to meet our water requirements in the future.
- Provide an incentive scheme to reward wise water use practices by individuals or companies.
- Incentives for improvements in water usage by industry. Carrot and stick approach: A carrot of big but targeted tax breaks for equipment to reduce water use. Stick of graduated water prices: the more you use, the more you pay per cubic meter.
- Research into and funding for improvements in water usage, especially for farm irrigation. Traditional irrigation is wasteful because of evaporation losses. If China can improve water use by proper selection of crops, so can we.
- Municipal incentives for water conserving practices: rain barrels, xeroscaping, perhaps charges for excessive use of water (private pools, etc.) would encourage an ethic of wise water use.
- Government financing for agribusiness to procure water conserving irrigation methods. Would encourage agribusiness to abandon inefficient technologies and would eliminate the major barrier to change.
- Provincial government must investigate water applications/licenses in terms of conservation, sustainability and harm to environment.
- Investigate water license applications in terms of conservation and sustainability of use.
- Government should not license the selling of water.
- Establish fair and equitable water conservation incentives. Make sure that not all rebates go to favoured industry sectors.
- Industrial use of water where the water is not recoverable through recycling should stop.
- Before water licenses are issued, a complete in depth evaluation of the supply should be done by government.
- Insist that municipalities meter their water e.g. Calgary.
- Prices for water for individual use should NOT be punitive, so threshold uses should be established with scaled pricing. Charging each user identically will not harm the rich, only the middle and poorer classes Set variable pricing for domestic water use, putting higher premiums on high users.
- Better water use practices. I see poor irrigation practices as a waste of water often (e.g. Should not occur mid day ? evaporation is highest and most lost).
- All funds collected due to a water pricing strategy be directed only into a water resource fund. A water resource fund could be used to reclaim or purchase lost wetlands, waterways and flood plains to encourage water quality and preservation.
- Fine people for inappropriate use of water, such as washing cars, watering lawns, and industrial miss-use of water. Do this rather than charge people for the right to water listed in the first two options of this list. Water is not a 'product' it is a natural resource that sustains life. It is wrong to treat it as a 'product' that those with money can purchase. Need to educate people to respect water and use it wisely.
- Have all water intakes on stream downstream from all drainage systems (storage, sewers) so that discharged water is properly processed before discharge.
- Ensure industry uses water efficiently by charging for its use.
- Strong penalties for those impacting water quality.
- Determine and charge industrial, agricultural and municipal users the full costs of water quality reduction (treatment of return water to the same quality of that removed). Decreasing the quality of public water to dilute waste produced for private benefit is a disincentive to wise use and conservation.
- Mandatory metering of household use, as basis for municipal charges.
- Encourage water quality conservation. Makes individuals and business more responsible and aware of the implications of their actions; discourages the "amendments to nature" attitude (i.e. discourage fertilizer, pesticides, manure accumulation, etc.).
- Subsidize technology/equipment that helps conserve water.
- Look beyond the economy and show people how water keeps the planet alive and that we are a part of this cycle, regardless of what the economy dictates.
- Do not take any steps that will subject water to the conditions of NAFTA, FTAA, or any other free trade agreement. Although Alberta's own water problems will provide plenty of stress on our ecosystems and society, if our water begins to be sold or shipped to other countries, the results will be devastating.

- Ad campaigns highlighting the fact that water is scarce in Alberta. Advertisements could be a very effective way to convince skeptics that water is important.
- Strictly enforce fines for irresponsible or excessive use.
- Albertans need to be educated about the importance of water from a young age.
- Focus major conservation efforts on irrigation (agriculture) since it uses the vast amount of water in Alberta.
- Establish seasonal differences in pricing to reflect demand: for example, higher prices in summer in municipalities where people are watering lawns, washing cars, etc.
- Consider taxing excess water uses such as lawn watering.
- Encourage municipalities to charge reasonable rates rather than flat rates (I mean a per use rate).
- Establish metering systems.
- Provide subsidies for increased development in water conserving goods and services.
- Take 10% of arid south and southeast lands out of production and dedicate to grassland conservation.
- Encourage land use practices that are consistent with local conditions.
- Foster best practices in water reuse (grey water recycling in buildings, etc.)
- Government cannot license the selling of water.
- Government cannot license the selling of water.
- Water license applications evaluated in terms of sustainable development.
- Pricing should be structured around consumptive vs. non-consumptive water users (different rates) and tied to the users potential of altering the natural quality (or some threshold).
- Ensure water conservation standards are incorporated into building codes.
- Establish policy for new home/office, etc., construction for water saving appliances (i.e. full flush or partial flush toilets as currently in use in Australia/New Zealand).
- Introduce a user rate for water. The higher the volume the greater the change per m^3.
- Give incentives to users who find alternatives.
- Use water sales (royalties) to improve all aspects of water management in the province. Royalties may be viewed as a tax. Would increase conservation, research, and provide a funding source for infrastructure improvements.
- Regarding water pricing, I support prices on the treatment and delivery of water, but not for the water itself. I worry that if we place a price on water, we will expose ourselves to claims by our NAFTA partners that water must be bought and sold like any other tradable commodity. Alberta legislation banning water exports may not be enough to keep our water for ourselves.
- Have an overall overseer evaluate the effectiveness in each sector. Sectors know individual issues best and an overseer can provide unity of vision in the goals to be set and achieved.
- Issue allocations that are low enough to ensure that water is being used wisely.
- Establish and enforce a large fine on those who greatly pollute waterways. Lower business incentives.
- Encourage native plantings and xeroscaping. Develop education process and encourage landowners, householders and landscaping companies to develop expertise in these low water consumption techniques.
- Regulate industrial and agricultural use of water such that ANY water use must be returned to the same water regime as it was obtained from ensuring that the water is treated to meet the minimum needs of the environment that it is being returned to. No deep well disposal or long-term tailings ponds.
- Put a price on water and use the revenue for water development and conservation.
- Establish water conservation efforts funded by a tariff on water.
- Establish commercial rates that are as high as residential consumption rates. Ensure that industry is not subsidized by residential use, but that residential use is given a priority and preferential rate.
- Insist that residential and commercial users start using two flush option tanks to reduce water consumption. Import water tanks from Australia that allow two options for water dumping for different waste conditions.
- Provide incentives (rebates) for municipal homeowners/developers to install composting waste systems.
- Establish a price for water used by industrial operations for export products.

- Encourage water conservation in cities, towns, municipalities.
- Discourage poor use of water: watering lawns, golf courses.
- Industry must be more accountable: they would drain our rivers and basins for their bottom line.
- Establish a price for water used by industrial and agricultural operations by a non-profit organization. No one should profit from the sale of water since it belongs to everyone.
- Discontinue the practice of allowing the oil and gas industry to extract large amounts of water from rivers, aquifers, etc. Increased cost to oil and gas sector but they do have other options.
- Limit large scale water extraction for the purposes of selling bottled water outside of the province. Purpose would be to ensure that the water is being used by Alberta taxpayers.
- Use monies from water use fees to pay for the water information system and compliance assurance and to assist in research and technology development. Using the monies for these purposes creates a double benefit for continuous improvement and assists with the assurance and preparedness functions as well as the influence function. It also allows government to privatize the delivery of monitoring and some inspection/audit activities. Charge different prices for water depending on its scarcity, the quality required and the quality and quantity returned. Pollution of water and discharge of polluted water should also have a charge, also consider discharge rates that vary depending on the quality of discharge, and consider incentives or regulations to protect and enhance key groundwater recharge areas and maintain soil moisture such as reforestation. Flooding and moisture deficits can be influenced by the type of land use and cover as well as by infrastructure such as dams and may be more cost effective over the long-term.
- All water supplies should be fully metered. Cost to install, but better accounting of cost and use of water.
- Transportation (highways) development impact surface run-off.
- Storm water should be impounded on site and used for irrigation.
- Establish a price for discharge of industrial/agricultural water.
- Establish a price for water drained from wetlands.
- Establish a progress report for industry, agricultural and residents to identify each contribution toward the conservation of our water supply.
- Set tax incentives for a set period of time and then evaluate and determine the benefits.
- Assume a baseline provision for manufacturing aquatic systems is free.
- Need to look at recycling systems to recover water to reuse.
- Bar fresh water injection into oil recovery systems.
- Establish tax incentives for individuals or companies that improve their water efficiency.
- Establish alternative technologies strategy for industry.
- Establish a price for water used by industry.
- Find other source of water (e.g. deep salt water) for industrial use. Added cost to source this type is passed on to the consumer.
- Charge municipal, industrial and agricultural business the same dollars per m^3.
- Install water meters in southern Alberta
- Encourage water-efficient appliances, such as front loading washing machines.
- Water should not become a commodity for sale to the highest bidder.
- Education of citizens should be a priority in schools and for adults too.
- Industry conservation measures need to be addressed e.g. oil and gas or intensive livestock operations.
- Review irrigation practices (some areas not suitable for irrigation due to salinity problem, or irrigating where not needed.
- Industry's recycle and treat water to reuse water (reduce new water consumption and effluent).
- The need for better agricultural irrigation practices.
- There should be grants available to purchase water serving items i.e. toilets, shower heads, kitchen taps, auto shut offs example shower heads.
- Promote alternatives for oil-gas water for injection use?
- Agriculture is a food producer and should be encouraged to use conservative measures when dealing with water but must be allowed to use whatever it needs at little or no cost.

- Protect water quality of rivers, streams, and groundwater with regulation, monitoring, punitive fines and development consideration.
- Work with irrigationists to improve conservation efficiency and productivity in their use of water. Possible big water savings and no need for inter-basin transfer.
- Establish practical research and outreach resources for best practices in water use and water conservation at colleges and universities.
- Require metering for all municipalities.
- Establish a price for water used by individual households, proceeds going directly to water conservation in Alberta.
- Conserve Alberta's water quality and quantity.
- Not to be shipped south of the border.
- All water should have the same value - no "industrial" rate vs. "consumer" rate.
- Set hard targets for water conservation for various sectors using legislation and enforcement actions. More than guidelines are needed.
- Establish a price for water used by industrial and agricultural operations that are owned by non-Albertans. Albertans should not have to pay for their own water. If a company makes profits from our water and the profits leave Alberta, then they should be charged. Likewise, there should be a charge for exporting water.
- If a farmer or rancher drills and pays for his own well he should be taxed for household use and a rate per animal using the water.
- Fine households and businesses who visibly and carelessly wastewater (i.e. lawn watering when hot and dry and windy or when raining - fines paid could be used to finance conservation incentives. Provide a toll free "tips" line so that public can report abuses (rather than just complaining about them). Then action to investigate and/or fine must be made public.
- Equalize water treatment costs across the province.
- Provide incentive for preserving wetlands and riparian areas.
- Discourage channelization and land drainage. Reduce greenhouse emissions. Warming increases evaporation!
- Set up water management districts that enforce regulation and allocate water.
- Encourage industry (oil and logging) to be better water conservers
- People should be made to change old fixtures in home to water saving (e.g. toilets and showers).
- Above targets must address conservation of wildlife and its habitats.
- I believe development of irrigation at tax payers expense is wrong.
- I believe oil companies, chemical and forest should pay to be monitored.
- Service industries with water requirements due to their consumption volume.
- Place water meters in all homes, rural or urban.
- Protect recharge and discharge areas. May be hard to gain public support.
- Pricing, while undesirable, may be the only way that conservation of water resources may be embraced. The water in the ground is not unlimited.
- Start educating in elementary grades about water conservation values and methods. This would create a generation of concerned conservationists.
- Set a cost of $100 per household, per year. Homeowners may become more conservative in water consumption. Water meters at each household and business would be required.
- Ensure ecological use of water is free and first priority.
- Promote new technologies for water conservation through education and shared cost agreements between government and agriculture/individuals, agri-business and industry might be given tax credits.
- Have two plumbing systems one for drinking and one for grey water. Increased costs for new system. However, increased savings in the use of water for needs that do not require water to be safe for human consumption. I think some European countries have this system?
- Set mandatory practices for sectors using BMPs.
- Establish a price for water used by industrial and agricultural and household purposes above a reasonable threshold. Encourage conservation of water and practices.

- Establish and enforce real penalties for abuse of water systems by industry/agriculture/individuals.
- To encourage conservation, industry should have to recycle their water. Closed system. Top up when necessary only.
- Do not establish a price for water used as the risk of having to sell outside of Canada, or within, (e.g. NAFTA) is TOO GREAT. Water should not be a commodity that can be bought or sold.
- Control the use and ensure "Wise Use."
- Conservation cost versus cost of dams etc.
- We are told that Calgary does not charge for water and uses 1 ½ times as much person as compared to Edmonton that charges for water used?
- Don't wastewater irrigating crops in areas that are better suited for grasslands/rangeland.

Red Deer and south

- Investigate low-flow toilets.
- Encourage alternative to lush green lawns. Often local bylaws prevent alternatives.
- Establish a price for water used by small agriculture operations and acreage owners.
- Don't subsidize industries that wastewater (i.e. provide little social and ecological benefit).
- Water used to pressure oil wells should be stopped.
- Prohibit surface water injection for oil recovery. CO2 should be used.
- Limit use of treated water to irrigate urban lawns.
- Try to change overall society view that a green lawn is a good thing - change urban development. It is not easy to change an ingrained suburban value.
- Also establish pricing for water consumption above basic needs. "Prohibitive" pricing for abuse will soon "educate" everyone.
- Increase tax assessments for residences, business, and industry that have built huge capacities for water consumption (e.g. , large water heaters, multi bathrooms, large bathtubs, etc.). Call it what you will, but users again should pay up front for excessive use capability.
- Legislate requirement that all users of water have a heater at taps so "cold" water is not wasted. Also have shower "shut off" valve to user can halt flow of water while applying shampoo or body wash.
- Conservation is encouraged with water transfers. Only water that is actually used by license holder can be transferred.
- Agricultural community to improve conservation measures of existing licenses if growth is sought. southern Alberta already over-allocated. If agriculture is to grow, it is agriculture's responsibility to improve efficiencies.
- Ask south agricultural users to upgrade and pay for irrigation district. Water waste there is atrocious. Should not give water until upgrade complete.
- So far as I can tell, the Alberta government has not thoroughly researched what all this water pricing and pipelining will do as far as NAFTA, Chapter 11. All this bitching about not enough water in Alberta for agriculture will seem like good times if U.S. companies come into Alberta and start pipelining what we don't have south of the border.
- Make grey water recycling mandatory for hotels and homes.
- Put timers on lawn watering, including golf courses.
- There is a price to pay for water. Those who use more must be required to pay more. There must be an education component to conservation.
- Large pig factories have to be accountable for their water usage. Currently no one is refused a licence to divert because that would limit their growth. Government must recognize the potential of these pig factories to utilize great amounts of water and then polluting and contaminating all other water sources by spreading and injecting into the soil. The land cannot use all this manure and massive amounts of manure is contaminating our waterways. With the growth of this industry, this will only get worse.
- Charge for water based on a priority basis. The higher the priority the lower the cost. Income derived can help defray the costs of new initiatives, including tax rebates.
- Need to work with intensive livestock operations, industry and field crop farmers to find ways to reduce the contamination of clean, fresh water. Farmers need to reduce or eliminate use of herbicides and

pesticides. Farmers need to stop dumping untreated waste. Industry needs to be more careful with their discharges.

- Encourage all users (by financial reward/penalty) to return water in better shape than when they pulled it from the system.
- Penalize users who use but do not treat water (e.g. feed lot operations).
- This question violates the water act. What is it doing in this workbook? Perhaps there is a lack of communication between government departments. I don't suppose you can embarrass your own department; politicians need thick skins.
- End fresh water flooding of oil/gas sites.
- Establish storm water conservation for toilets, grass watering, use other than drinking for cities.
- One excellent way to conserve water on controlled water pipeline systems would be to place electronic restrictor valves that would regulate pressure in lines as to the amount of flow. Users of water would then know immediately when they reach their limit.
- Should the government make industry pay a flat rate for the use of water not based on quantity to off set water management costs?
- Investigate incentives similar to carbon sinks credits. Municipalities employing metering, low flush toilets, no pesticide policy, etc., should receive credits.
- Establishing price precludes water becoming a saleable good under NAFTA. It encourages monopolization of usage and may possibly threaten each citizen's right to water - depending upon competence/incompetence/economic biases of the administration enacting this.
- Check existing infrastructures to assess losses i.e. leakage.
- Old technologies to be upgraded.
- Make water meters mandatory in urban areas.
- Water should be re-used especially in industry where non-potable is needed.
- Conservation does not necessarily mean use less, but use it efficiently.
- Surcharge for water usage in excess of a household limit. Discourages waste. Requires a water meter in all residences, including apartment units.
- Long-term commitment of funding from government.
- Stop deep well disposal of industrial wastewater.
- Promote technoloy for water recovery and recycling.
- Offer significant rewards for finding/inventing significant water conservation/ecological protection methods.
- Establish credit for water returned to rivers by sewage treatment plants. Not all domestically "used" water is permanently removed from rivers.
- Remove water allocations in instances where there are potential impacts due to over allocation.
- Apply different prices to different water quality types to encourage industry to treat and re-use water or use less clean sources of water.
- Keep our water supply in the hands and control of the people of Alberta.
- Develop and implement water conservation methods for systems using surface water withdrawn for irrigation. Since roughly 95% of water consumed in some southern rivers is used by irrigation, that is where the potentially greatest benefits should occur.
- Develop water conserving types of agriculture and gardening in the city.
- Provide incentives for manufacturers to produce water - conserving devices such as toilets, showers, sprinklers.
- Stop subsidizing low value irrigated agricultural crops.
- Prohibit the use of potable water for oil and gas production e.g. water floods steam injection etc.
- I have spent some time in third world countries where there is an allotment of water – at the level of individual citizen use up to use by industry. Perhaps this tough stance should be necessary here eventually to ensure that what will be a dwindling resource, even in our developed society, does not become as desperate ultimately as it is in these other countries.
- A danger that as a valued commodity there is the temptation to sell water outside of Alberta. Once started this way maybe impossible to stop.

- Individual meters for water consumption on homes, with a price per volume used. Doesn't address industrial usage.
- Set water prices (least to most) based on impact (least to most) to the water source accounting for: availability to other users after use, relocation, phase change, quality change, loss to mankind. Someone who diverts and returns the water nearby, with the least impact; short time frame (1 day); location (200m); same quality and state; returned to hydro logic system pays the least (e.g. small hydro). Whereas the most impact (opposite) is someone who pumps water deep into the ground to be lost for millions of years; they should pay by far the most (e.g. oil recovery wells).
- Revise plumbing codes, etc. to require more water efficient appliances, etc.
- All households and industry should be metered so that they pay more for using water inefficiently.
- Practice xeriscaping on public lands and encourage it with private citizens.
- Encourage retrofitting with grey water systems to decrease amount of treated water used for lawn watering and car washing.
- Allow grey water-recycling systems for irrigation for municipalities and individuals.
- Since agriculture uses the majority of water, should research be established to find a better way of irrigating crops? More intensive agriculture farming could be researched and promoted.
- Simply establish a price for water is very simplistic. Cost to the user must be based on volume used above a certain minimum amount. Water conservation is rewarded through lower utility bills.
- Establish price for wastewater discharges by industry, agriculture, households. The cost of wastewater treatment is large. Withdrawals are reduced through levies on wastewater, encouraging recycling and mor efficient use of low or treated water. These mechanisms must be seriously investigated and tested.
- We should stop logging and road building in the foothills to protect watersheds.
- Require water conservation equipment in new homes/businesses (e.g. low flush toilets).
- Establish a price for water used by individual households, over and above a minimum allocation required to support life.
- Prefer pricing of water use to incentives (more easily measured).
- Awareness and education has to start in school.
- Remove irrigation subsidies.
- You pay for what you use. Per litre. Cost of meters will be large.
- Set water reduction goals including recycling goals for large commercial agricultural operations
- Set water reduction goals for oil producers to control demands for surface and groundwater.
- Agriculture already pays a user fee to the irrigation districts.
- Impose fines on water wasters (i.e. sidewalk wasters).
- Install water meters on all homes. Cost absorbed by governments (municipal, provincial and federal).
- Require new industrial facilities to incorporate in design (closed loop systems). Offer incentives to existing industrial facilities and to individual households to retrofit for eco-efficiency.
- Apply financial penalties to companies not using water conservation methods.
- Mandate water conservation measures as has been done in Australia.
- Encourage sustainable housing.
- Research and development into various options (i.e. effluent reuse schemes).
- Public awards and recognition for municipalities and industrial, agricultural operations achieving/exceeding targets or demonstrating innovative water management/conservation strategies.
- Review use of water for agriculture, review crop types based on location. Are we growing the best crops for the climate (i.e. southern Alberta - I don't think so)?
- Encourage industrial users to treat and reuse their wastewater. Give incentive for reducing water taken out of the system.
- I recall an information session from the Crown using examples of the return on investment and the extremely poor result it had in actual water use reductions. Don't reinvent a wheel if it has proven to NOT work. My recollection of the information needs to be verified though.
- Encourage the use of less water in the home. Install low flow toilets and low pressure showers.
- Make water meters mandatory. Installation of meters.

- Stop developing private lakes for urban communities (i.e. in Calgary - Arbour Lake, Coral Springs, McKenzie Lake) very poor use of a precious resource.
- All water users should pay fee for water available. The first in time, first in right distribution of water should be reviewed. Use the measure of best usage for agriculture purposes.
- Ensure water users are metered.
- Legislate household plumbing technology to maximize conservation.
- Limit irrigation times to watering during hot/windy days.
- Rule out any future possibility of developing a "tax" on water. Any form of taxation or pricing of water that is alleged to promote efficiency at the diversion point will only raise money and not promote conservation. Individuals, farmers, organizations pay for conveyance, treatment, application, etc. A "passed on" tax could ensure that people use enough water to make sure they get value for what they are paying. High priced cigarettes are not getting everyone to quit smoking, and high priced gas is not limiting the purchase of SUVs.
- Positive peer pressure coupled with regulation should yield good results.
- A water tax creates money, but will not save water.
- Where does revenue go? Must be reinvested in watersheds.
- Restrict livestock from riparian areas.
- Offer incentives for changes to irrigation equipment to cut water usage and get better water usage.
- Be serious about water conservation. It saves money as well as water.
- Educate people about needs of river ecosystems.
- We are already short of water. If you want people, economic growth and livestock you need lots and lots more water.
- Stop pumping water into oil wells.
- Ensure that projects like this are not biased in favour of development etc.
- Educate decision makers and the public. Teaching at schools, colleges and Universities.
- Enforcement of existing legislation dealing with pollution and wastage.
- Reward industry, municipalities and rural users for conservation efforts.
- Provide alternate solutions to efficiency problems.
- Agreements with downstream provinces should be reviewed. Who references the process?
- Charge all users (i.e. recreation). Excessive administration cost.
- Incentives for large industrial facilities to minimize water use and treat wastewater for return to watershed.
- Reduce waste, establish pricing based on best practice use. Charge more or limit use to need based on best practice. Allocations which are lost (seepage, contamination, evaporation, etc.).
- Prohibit industry from using potable water for injections, etc.
- Reward protection and rehabilitation of riparian and aquatic environments on private or corporate lands.
- These, as well as question 9, are somewhat misleading for Crossfield. We belong to the Mountain View Regional Water Commission. We (the 6 towns on the commission) invest in the commission. We also charge the towns for the water.
- All urban users should be metered and pay true costs. All domestic use should be free of water source charge.
- Implement and maintain a thrice weekly watering program in municipalities that will be in place at all times not just times of drought. This goes a step further than the present setup of even and odd day watering and is kept in place regardless of the present circumstances. Of course the complete ban on watering would be implemented as the need arises. People would become more aware of the correct time and amount of watering, thereby preserving their ornamental landscapes and at the same time they would be conserving water.
- Design effective, clean, practical, attractive, non-smelly chemical or gas fired toilets - save huge volumes of water.
- Tax incentives for companies recirculating water instead of running it through and out.
- Quit putting industrial with agriculture. The two are separate.
- Agriculture should not be lumped in with industry.

- As an individual household with a private well I already have paid to get that water.
- Stop all fresh water use for oil well injection.
- Water used by a business to generate a profit is an expense and by charging a fee, businesses would conserve water. The cost goes on to the consumer.
- Why is it operators don't pay but individuals do? Do they get charged a fee for using the water?
- Establish an economic cost of water as basis for price (including all external cities).
- Phase in water metering for all more quickly in Calgary (not 12 years).
- Fine those people who wastewater.
- Offer incentives to encourage water saving devices in residential and commercial establishments – make them convenient. Province needs provincial legislation to enable municipalities to change the plumbing code to enforce installation of low-flow toilets and other devices in new homes.
- Tax all water users and provide rebates for conservation. Everyone pays, efforts to conserve are rewarded - shared responsibility for water.
- Insert systems of use, recycle. Set target of "sustainable."
- Should government establish price for water for industrial or agricultural?
- Water use for domestic use (household) not be charged for except by municipality treating such.
- Irrigation canals should be covered over to conserve water.
- Use water metering and apply increasing rates as consumption increases.
- Regulate appliances based on water consumption. Low flush toilets, washers, showerheads.
- Provide incentives or bulk purchase agreements for water conservation technologies.
- Water credit ideas.
- Money is more wisely spent on developing efficient water conservation systems.
- Establish a grant system or tax rebates or conservation credit program like the carbon credits that encourage industry to implement water conservation methods rather than charging them for use.
- Water conservation should not be practiced just to add more industry and irrigation to water system.
- If farmer digs well or dugout, puts in water system and pays for it, then you want to charge a fee for water?
- Lower the pressure in municipal systems. Direct approach to encourage conservation – less comes out of the tap.
- Establish a minimum usage of water free of charge, anything over a certain amount, charge a fee based on actual usage for agriculture, household and industrial.
- Water licence users out of rivers, lakes, etc. should be charged for water the same as irrigation districts charge. This money should go to infrastructure development.
- Irrigation districts should put limits on use and monitor use more closely.
- Looking at ways to recycle water, particularly in farming and industry.
- Encourage installation and use of domestic water meter.
- Discourage excessive irrigation of lawns, gardens and crops.
- I would not like to see a price on water but a charge for conveyance would be appropriate.
- Require all small municipal and urban households to install water meters and set allocations.
- An abundance of water should not be free or taken for granted - conservation should be everyone's responsibility.
- Use all available technology to reduce water wastage and provide incentives to upgrade wasteful practices and equipment.

did not indicate location

- Penalties for wasting.
- Also consider a conservation cover incentive program as vegetation is important for water quality/quantity.
- Alberta Government "manages" our water only, right? Water is an inherent right. Remember the poor.
- Educate children more - they influence adults more than we know - conserve in youth = conserve in life.
- All municipalities should have water metre. Municipalities should have water conservation program.

- Encourage development of sectors or industries that are not so dependent on water uses. In agriculture for example, small scale operations growing high value crops would be better than irrigating hay. More efficient irrigation systems should be used. Renewable energy (e.g. wind and solar) sector should be strongly emphasized to reduce water use and diversity energy and economic base.
- When water becomes a commodity, does it become a right or privilege?
- Water loss: non-renewable into water wells. Oil field injection to equal Calgary, Edmonton, Red Deer use in one year.
- Investigate water license applications to determine whether appropriate conservation and sustainable usage is being implemented.
- Do not privatize or license selling of water.
- Take all railways out so we don't have to ship. Add local support industries home-made if necessary. Live off the land nothing else can.
- High level meetings. No more difference of opinion allowed. Ours will be right.
- Does the oil and gas industry really use potable water and then dispose of it? Could they not use a different type of water - one that is less valuable?
- To protect wetlands make no land tax on that portion if private individual sets the land aside.
- Water is a requirement of life - we do not own water.
- Legislate the mandatory use of water meters in urban households. I believe the City of Calgary has given residents 15 years to make the switch. One year would be more sensible. Legislate to restrict use of urban fertilizers that are non-essential anyway. Without rules, and penalties for breaking them, people won't change their habits.
- Pricing water may put us at risk for NAFTA law - if we price water in international law we may be required to sell.
- Ensure all ecological use of water is free, without monetary cost, and first in priority. Human health and economic wealth depends on a sustainable environment.
- Use quality improvement program to set targets.
- Household use first priority.
- Water reuse, recycling.
- Retrofit all government owned buildings to conserve water and develop incentives to encourage industry to follow suit. Lead by example, plus make significant annual reduction in water use.
- Differentiate between agricultural use that returns water and those industrial uses that do not.
- Place a price on aquifer removal by gravel/sand companies (i.e. royalties similar to oil/gas/forestry) and place the assessment and monitoring as requirements for water aquifer damage.
- Offer incentives for companies to use industrial ecology principles. Over time, ban "open loop" industrial use of water (i.e. close loop systems to both reduce water consumption and reduce contamination of water supplies with emissions and effluents).
- Determine cumulative damage to river regime (i.e. aquifer in areas where gravel extraction is over 5 hectares).
- Mandatory metering accompanied by fee to cover cost of services provided.
- Household usage a first priority.

Safeguarding alberta's healthy ecosystems

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option.

Respondents commented on options presented in question 12 and also provided their own examples.

a. Determine how much water the aquatic environment requires to remain healthy.

north of Red Deer

- I'm surprised you don't know this.
- Must determine the maximum amount not the minimum required by the aquatic environment.
- It is difficult and maybe getting an exact accurate figure is impossible but it will help. Use this figure as a minimum and don't leave aquatic systems with only this amount of water. How do we tell what is considered healthy?
- Until this determination is made – err on the side of safety.
- Needs to be priority. This should be a given. Need to complete and provide funding for it.
- Determine by who and what are their motives.
- Impossible.
- Provided that a diversity of views is considered in the determination, as scientists are likely to disagree on this.
- Be generous in this estimate.
- They are already in jeopardy. No more pollution.
- Should not be minimal protection.

Red Deer and south

- Get with it. This is long overdue.
- Who will do this? Government has cut staff so drastically that many suggestions in this workbook cannot be implemented.
- But must be generous due to human error and lack of understanding all the factors.
- If you don't know stay away from the chance of harm.
- How would you safeguard against drought times etc.?
- Get an estimate rather than a lengthy detailed measure.
- Human needs are 5% of the use, agriculture and industry are 70%.
- What if we have severe weather and the river dries up.

did not indicate location

- Commit to regional scale mapping of all groundwater aquifers in Alberta.
- Each river system must have its own loading criteria established for high, medium and low flows.
- Allow water systems to heal.
- But err on the side of conservation.

b. Determine the balance between the amount of water needed for the aquatic environment and amount needed for economic growth within a water basin.

north of Red Deer

- Ecosystem should take priority.
- Bad question. There is no balance. Minimum in-stream flow needs cannot be compromised through a balancing act.
- The same flawed logic again. Why is "healthy" omitted from this question? You cannot continue to have economic growth when you have only a finite amount of water. Ideally the economic growth will be stopped and stabilized well before the health of the aquatic environment is too severely degraded to be called "healthy" anymore. It is not a balancing act. You find the point at which you don't want to degrade the aquatic health any further, and you shift the economy into a steady-state economy before that point is reached - or else the aquatic health is wrecked. You need to consult a good aquatic ecosystem biologist, desperately!!

- Water management plans should be used to determine the balance between the amount of water needed for the aquatic environment and the amount of water needed for economic growth within a water basin.
- Environment before expanded industrial needs.
- Ambiguous economic growth has no limits but water and aquatic ecosystem is a finite resource and will limit economic growth when social and environmental values are destroyed.
- Yes, but should be a minimum requirement to ensure there is in-stream needs protection.
- The environment comes first, not economic growth.
- This should be done on a global and local scale.
- Impossible.
- Provided that economic actions continually move toward efficiencies and best water practices.
- Water management should never be maxed out for the use of water by industry. It is okay to know this amount but should never operate even close to the maximum no matter what industry or economics want.
- Economic growth must be second to environmental sustainability.
- Protection of the aquatic environment should take priority.

Red Deer and south

- Must be based on extensive and sound science/ecology.
- There has never been any balance between the environment and economic expansion in this province.
- The value of water to our existence and a healthy environment does not change and must take precedence.
- You have admitted you don't know the aquatic needs - bad question.
- Leading questions - these have been studied for a long period of time. Change to justify economic development within a given basin; adhere to claims justified if development is granted.
- We cannot exceed the ecological capabilities of a watershed, a province or planet earth without causing a downhill slide of all affected systems, including economic, to disaster.
- Who wouldn't agree with the idea of establishing a balance between economic growth and environmental considerations? But everyone will have a different definition of the balance point. So this principle needs much more specific goals and objectives to be meaningful. Also, there are environmental thresholds of cumulative impact that must be recognized and which may require an "imbalanced" approach to water management in times of shortage.
- May need revision every ten years.
- Not a balance: it is an issue of sustainability. Should read: "economic growth within an ecologically sustainable water basin"
- This is not really an option. We may prefer, but we do not need, economic growth, and we simply cannot have it without first having a sound aquatic environment.

did not indicate location

- Who decides this? Compromise is always imposed on government employees who have the information by politics and industrial use.
- Aquatic environment should be given greater weight.
- Healthy environment = healing economy. Don't compromise the environment.

c. Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm.

north of Red Deer

- Introduce enabling legislation. Today impossible to get disparate groups to work together. Force them no political will here and no will to enforce plans once they are made.

- Zero tolerance.
- No. Do not determine the maximum amount of poison that can be put into a lake or river - because someone then will! The goal should be minimal or no introduced substances in the river or lake, not how much.
- A zero tolerance of substances (e.g. phosphates going into system should be adopted).
- Important information, but the aim must not be to pollute to the maximum.
- Needs to be below maximum. Need to be safe.
- I just think this is very difficult to determine and whether it will accurately represent a true number. Also I feel if we calculate this amount that we will put the max amount of substances in, thinking it will be okay, and it may really not be okay.
- Need a margin for error on future demands.
- Government needs to do more research in this area.
- Set minimum as max level.
- All phosphates should not be put in water systems.
- This is useful to know, but our true goal should be zero pollution. Setting a minimum level encourages people to continue polluting.
- It is dangerous to determine how far you can push the environment. The goal should always be sustainability of diversity - NOT push the limits.
- I don't think we should be putting the maximum discharge in - that is not healthy for the water system or the humans who consume it or use it.
- These values change with other variables and awareness and should never be allowed maximum.
- I hope this is happening right now!
- I have a problem with allowing pollution up to the maximum. I do not agree with using up the capacity.

Red Deer and south

- Monitor and enforce it.
- Should encourage 0% increase in nutrient loading into a river.
- This question seems to go at the problem from the wrong direction. Why should a water body be subjected to pollutants and if so, should we not be looking at the minimum?
- Why maximums? Why not think and act in terms of minimums.
- Why are we always trying to find out how much crap we can put into our environment? We must think differently.
- We should avoid the approach of trying to discover the maximum permittable pollution our air land and water can accommodate. Instead we should work on handling our needs in the best possible and practical way.
- Difficult to find a maximum without going over that limit. Also, each water body will have a different maximum. Overall I feel this objective has too many risks associated with it.
- This should not be taken as an "allowable level." Impact of substance must be minimized – not just kept to a figure like this!
- Elimination, at least reduction, of pollution should be our goal, not determination of maximum sustainable pollutants. How quickly can maximum values be exceeded?
- We still do not understand completely the impact of many decisions that are made regarding the use and management of our water [and land] resources. Why is it necessary to ask the question: "Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm"? so we can allow industry and municipalities to dump in as much as possible?
- Above option "Determine the maximum amount of substances," set target well below this limit.
- Don't let it happen in the first place.
- Prevent pollution rather than maximize.

did not indicate location

- Usually find out when damage is very visible.

- But let's not make it necessary that they must then be functioning at that maximum level because things will change.

d. Identify sensitive aquatic environments or habitats that require additional protection.

north of Red Deer

- Do this through University research - free!
- Establish incentives, but at no cost to the rural well owners.
- It's key to know this?
- All areas are sensitive and need proper respect and protection.

Red Deer and south

- Know your ecosystem before you mettle.

did not indicate location

- Already know lots about this but compromises are always demanded.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management.

north of Red Deer

- Aquatic ecosystems should take precedence.
- Don't beat a dead horse, use the knowledge we already have.
- I think there must be other ways of spending money to save our aquatic ecosystems and still grow, instead of doing research on how much we can pollute the environment that won't destroy it.
- Government needs to be pro-active and initiate use, not leave it up to community groups to do it. Often requires coordination and government could provide this service.
- Should be looked at separately first and then together.
- This is the preferred water management strategy in jurisdictions around the world.
- There should be integrated water management plans in place for all major water basins.

Red Deer and south

- A must. Again use good science and invest in it. We can't afford not to.
- Shame on you for asking us whether or not we agree with the obvious.
- YES, we have suffered from a too fragmented view in our approach to natural science – integration is essential.

did not indicate location

- This is crucial as we can't manage water in a vacuum.

f. Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use.

north of Red Deer

- People have to be responsible for their actions.
- Balance is key. Do your best not to tip the scales to profit.

- Depending what the end use will be.
- I can't emphasize this enough. If we don't protect our natural ecosystems, we are not going to be able to achieve economic growth (in the long-term).
- Levels may not be largest concern.
- Develop a "best practices" program and an aquatic protection incentive program to address the problem of the destruction and misuse of aquatic habitats on private land (e.g. clearing up to the creek banks, intensive livestock program along watercourses, and building homes on flood plains of rivers). There are no regulations addressing the aquatic environments "buffers" along side rivers and lakes on private land.
- I don't think you need to sacrifice one for the other. You can have both.
- Promote the precautionary principle (i.e. after determining the minimum amount of water required for the aquatic ecosystem and the maximum amount of pollutant without causing harm, employ a buffer to these numbers to account for uncertainty.
- Strictly enforce fines on any persona, group, company, institution that does not use water responsibly or that is responsible for polluting, contaminating or killing/destroying aquatic life.
- Ecosystems should be our first priority.

Red Deer and south

- Life is more than just dollars and economy. Compromise our life support system and we have defeated ourselves with greed.
- We need water inspectors to protect human consumption and aquatic environment (i.e. Walkerton and North Battleford).
- Investigate options for the treatment of storm water.
- Not necessarily the same. The information book seems to state human use is 5%.
- Our land and water can only handle so much development. Know how large is large enough.
- We may have to limit economic growth.
- Why set this up as a conflict? Live sustainably.
- Not a choice; the only question is whether we act wisely and with the future in mind, or proceed with unrestrained growth and find that nature forces much more serious consequences on us later.

did not indicate location

- Develop new technology.

Add your own example...

north of Red Deer

- Monitor sensitive aquatic environments to determine what small changes are occurring before significant damage is done.
- Maintaining wetlands should be a priority. Education and motivation of private landowners is vital.
- Government monies should be used on programs that improve wetlands, and riverbanks (e.g. fencing of river and stream, planting of trees, reclaiming margin farmland back to wetlands). Tax breaks for farmers and industries that reclaim or maintain above standard riparian areas. Some areas of Alberta are not suitable for building a large industry base due to the lack of water. We should accept that these areas may not support a viable economic based and through better management and conservation of existing water and waterways there is adequate room for expansion in our current land use areas.
- Public parks provide aquatic environment enough.
- Healthy aquatic ecosystems are imperative for human health in the long-term. They must be maintained, and our economy must be conducted to protect environmental health. I suspect a profound ignorance about ecology on the part of the "ideas" generators. To suggest that economic and biological needs can be "balanced", suggests that the biological needs are negotiable. The biological needs for a healthy aquatic ecosystem are determinate. Once we take more water away than the system needs, it changes to a different system, ultimately to an arid system. Example of man's management leading to arid

ecosystems abound, and I suspect they would say that the "balance" was a good one. We ARE part of biology, and to not live within our means is to invite the inevitable catastrophic water shortage.

- We must keep our environment healthy or populations can and will be limited.
- Lakes, rivers, streams to be closely monitored.
- More investment in research and development in water treatment.
- Water conservation incentives.
- Put meaningful controls in place.
- Water conservation incentive(s) programs.
- Water conservation programs.
- Areas that are naturally dry or arid should not be allowed to develop huge water consuming industries such as golf courses, irrigated crops. Although there is an economic restraint, these type of operations will always be in need of huge quantities of water where it is naturally sparse.
- Without our wilderness Canada and Alberta will lose it identity. We need wilderness areas, large ones for our emotional and spiritual development as humans.
- Ecosystem use and economic development need not be at odds.
- Ensure that science is used to determine the impact of water use on aquatic resources rather than fear-mongering and misdirection as used by pseudo-scientific eco-terrorist organizations such as Greenpeace.
- Correct decisions will be made allowing the protection of the environment without unnecessarily stringent limitations.
- Reduce the use of pesticide and fertilizer applications to protect water quality.
- Promote and enforce retaining aquatic vegetation at lakes.
- Muskegs are essential in keeping wildlife viable and our reservoirs for water supplies.
- Natural wetlands are included in ecosystem protection plans.
- Please note; answers are very dependent on the words "determine" and "identify" rather than "implement." My answers may/would be different if the questions were posed this way.
- Water cannot be sold outside of Canada.
- Maintain enough water to ensure aquatic ecosystems and allow a generous buffer (surplus) to offset deforestation of supply area (East Slopes) and global warming and critical human supply demand in the future.
- Place more priority on zero discharge of contaminants to surface waters. Use incentives, R3D funding, stricter end of pipe standards to ensure this happens over the long-term.
- More research is required on the effects of contamination on the aquatic ecosystem (i.e. mercury, endocrine disruptors, selenium, etc.).
- Expand and enhance the "Forest Reserves Act" to include other watersheds.
- All the above issues have been discussed before. Now is the time to address them.
- Maintain water resources in a healthy state for the present and use it conservatively to ensure future generations have opportunities also.
- Economic development can only occur if the system is maintained first, otherwise it will not be sustainable.
- Improve the monitoring and enforcement ability of local and provincial authorities to help protect aquatic systems.
- Make sure that ecosystem requirements are met not at their minimum amounts but amounts that contribute to the sustainability of the ecosystem (i.e. cottonwood ecosystems need occasional flooding not just the trickle of water that sustains them for most of the year.
- So why hasn't any of this been done already?
- Establish research programs to better measure non-point pollution sources (e.g. runoff from agricultural lands).
- Subsoil and topsoil water amounts should be more carefully monitored in areas of high industrial use.
- Conservation, and costing of users, should include both drainages, and the drainage basins that supply them (land use, marsh conservation, changes in runoff patterns caused by forestry or PnG).

- Water withdrawals that affect discharge must be evaluated more closely.
- Develop processes and authority structures that engage and empower local residents in decisions on water quality, allocation and management decisions should be strongly influenced by local residents (including those downstream of users).
- Work on principal of pollution prevention – rather proactive steps to lower contaminates entering groundwater or surface water.
- Set and enforce strict standards for manure management, ad hoc inspections and fine for lack of compliance.
- Maintain current amount of water and have no further allocations to stop the unbridled destruction of our wetlands and waterways. No further economic development.
- It is very difficult to determine what a "healthy" ecosystem needs. Will not any biologist tell you that any substances (e.g. phosphates) will harm an ecosystem? We need to limit industrial growth according to what an ecosystem needs and develop non-consumptive uses such as eco-tourism, hiking, camping, etc. Our provinces annual revenue may be low for a period but at least the development will be long-term.
- Let the environment take its course and live within our means, reintegrate ourselves into the dynamics of the ecosystem.
- Ensure that any conservation decisions are based on good ecological and biological science.
- Prioritize health and functioning of aquatic ecosystems over economic growth. Ensure that future generations of humans and other life are left with enough water to function.
- Use native plants and trees in cities and gardens. They will be drought and cold resistant and will not require as much water or insecticides or fertilizers.
- Work with rural landowners to promote agricultural and rangelands uses of water that promote conservation of both water and native grasslands
- Creating guidelines, standards and legislation is great but there must be continuous monitoring and follow-up.
- Legislation to enforce the endangered species act and endangered habitat areas.
- Make all industries accountable for their practices.
- Water will be used not for economic growth but for economically sustainable activities.
- Water allocated for sustainable economic activities only.
- Maintain scientific understanding of the state of aquatic ecosystems and effectiveness of management actions, and adapt accordingly.
- In addition to determining amount of water for the aquatic ecosystem, determine the timing of delivery "requirement to mimic natural conditions."
- Have a guideline to amount of land to remain protected alongside creek/rivers, ponds, etc.
- Increase amount of protected (off bounds) land.
- Establish more provincial parks.
- In addition to developing water management plans, require a monitoring mechanism to ensure that changes to information and values on the system change over time.
- Discourage use of fertilizers, herbicides and pesticides, all of which negatively impact water sources.
- If further economic development cannot be sustained because of lack of water no economic activity should be allowed to take place. This would include opening up land for agriculture or industry.
- Ensure that there is an adequate supply of water left in an aquatic environment so that low rainfall would not put the environment at risk in dry years. Because rainfall cannot be estimated accurately development should not be allowed that cannot be sustained during a projected 3 to 5 year period of low rainfall.
- Economic development opportunities may be lost to achieve environmental protection.
- Restricting industrial, recreational and agricultural activity within certain proximity to wetlands and fish bearing streams.
- Identify the lakes and streams which have limited or highly variable water inputs and carefully regulate land uses and limit water removal from them. Some water bodies and aquifers are more sensitive than others - protect them first. Identify the groundwater aquifers that are likely subject to long-term industrial

or human use impacts (water quality) and especially those that discharge eventually back to the surface - protect them as a priority.

- Set effective control measures for all types of pollution; municipal, industrial and agricultural. Costly to put place but prevents pollution.
- Groundwater not yet mapped. We need more public priorization of this subject.
- Developing water conservation strategies.
- Public use of water (non consumption) must be addressed. Water craft, diving, residential dumping, etc. to establish better regulations and enforcement.
- Note, there should be no question about the allowable amount of substances, it should be zero for all. Any amount creates change.
- In northern rural Alberta the custom of having raw sewage dropped into the creeks etc. must be dealt with immediately.
- Develop water reservoirs to supply a year's needs. Make holding ponds to store water during run-offs.
- Develop wetlands. Many areas could be enhanced to supply water plus protect the ecosystems.
- Higher regulatory enforcement of industry.
- Improve aquatic environments (set aside more habitat).
- Wastewater plan for all areas. Increase the technology so that effluent goes back without additives and nutrients.
- Human life comes first; industries last and agriculture second.
- Do the lakes already contain too much pollution (instead of saying how much is too much)? Focus on the source of pollution.
- Fix up what we've already damaged.
- Work toward or encourage "zero tolerance" for pollution.
- No mention of wastewater.
- Ensure long-term aquatic habitat integrity even if it means a loss in short-term (1-30 years) economy. Economic development opportunities should be lost to achieve environmental protection
- We are an awful wasteful society.
- It seems that only aquatic issues are involved here. Land habitats (upland) are equally as important especially adjacent to drainages.
- Establish regulations for protecting watersheds that are a major water source. Watershed contamination can result in significant costs for water treatment downstream as well as causing environmental impacts to ecosystems.
- Having more aggressive penalties for industrial waste makers.
- Protect recharge and discharge areas.
- More controls on major industrial effluents. More provincial monitoring on effluents and on baseline levels in the receiving aquatic systems and having more stringent allowable limits on pollutants and components.
- This gives a very distorted view of what healthy aquatic ecosystems are, what they do, and why they are so important. You've missed the point. You've missed a great opportunity.
- Any person found draining a wetland on their property whether individual or industry, must be held accountable and be required to bear the full cost of restoring the wetland to its original state. All wetlands in the Province of Alberta should be inventoried and registered with the Department of Environment. These registered wetlands should be monitored and negative impacts that occur from human activities will automatically set a process of fines and restoration of the wetland to its original size and health into action.
- Need to consider protecting all elements of the ecosystem.
- Determine the balance between the amount of water needed for the entire ecosystem and present wise human needs. Any surplus to be considered for economic growth. Note the option above infers limitless economic and people growth which is not sustainable! Limits to economic growth and human population increases would be established.
- A zero tolerance on any substances going into the aquatic system should be taken.
- Environmental issues such as habitat protection should be the first consideration.

- Create new jobs that focus on and maintain measurements on all main water supplies. Daily. Use criminals to do this.
- Determine risks and key uncertainties using an adaptive management approach of water withdrawals for the aquatic environment.
- Municipalities are regulated to ensure quality water. Perhaps more focus should be given to ensure rural residents (i.e. farms) have quality water.
- Determine the effect on the environment of mixing various effluents and the potential secondary pollutants that may arise from the interaction of these effluents.
- Need to be careful as to who determines what areas need to be protected. Does the determination make sense or are there underlying reasons for the designation?
- Disallow use of water where alternative technologies are available.
- Bring in regulations to deal with water problems caused by inappropriate use of riparian areas.

Red Deer and south

- Water to protect the aquatic environment should take precedence over more industry.
- Ban all motorized water craft from rivers in Alberta.
- Develop a strong water enforcement strategy. More officers are needed for monitoring and enforcing more strongly the Water Act.
- Government must limit non-point sources of contamination. This is exactly how these operations are contaminating our watercourses and water bodies. Massive pig factories should be required to purchase manure allotments. This is currently being done in Europe where the damage of these operations is still being felt. Enforcement must become a major priority of this government.
- Recognize that humans are a sub-system of the earth, we don't run it - we have to live in it.
- Amend Water Act - article number 46 - to delete (3) that refers to processed water. Bottled water is a huge industry and Alberta should not allow licensing of a company to take water from our aquatic system to be sold out of Canada.
- Use aquatic environmental parameters to determine human use.
- Promote Alberta as a province that puts the environment first, people second, development third. Without a healthy environment, nothing else works......
- Discourage economic development and human settlement where water is in short supply (i.e. southern Alberta).
- Determine what industrial and agricultural uses are most appropriate given the land, water and climate of an area (e.g. don't grow wheat in drought prone areas).
- Determine aquatic need and health of riparian river regime and watershed from river recharge.
- Determine and prevent damage to river regimes and aquifers by gravel/sand companies and make real reclamation changes. Water assessment and monitoring.
- Should extensive monitoring programs be set up on all watersheds to ensure healthy ecosystems?
- Industry should pay for any pollution.
- Educate the public on evolution of aquatic ecosystems and their dependence on flow regimes.
- Limiting water usage is a double-edged sword with environmental concerns, biased special interest groups or individuals could fabricate environmental concerns to restrict or increase land development, land ownership and usage.
- Develop naturalization of ditches to provide shade and natural retention of water in the ground: increased groundwater through an ecosystem.
- Conduct research on urban surface run-off to determine impact on aquatic life. Investigate mitigation measures. May require investment in surface water treatment different than sanitary water treatment.
- Make it mandatory that livestock be kept well away from riparian habitats.
- Bad practices by forestry and agriculture that can degrade water need to be controlled. Less water will be made by farmers and lumberjacks but who wants to live in a treeless feed lot.
- Reduce pollution or water use if new information suggests impacts.
- Apply the precautionary principle when setting allocations and emission rates.
- Start diversifying based on sound environmental practices.

- Increase monitoring and assessment of surface water quality. Funds allocated to such work have drastically declined over the past 10 years. Most of the above cannot be done without adequate funding of surface water conservation.
- Ensure "distal" sites (most down-stream) achieve the required standard by governing the proximal upstream users.
- I am very concerned about the consequences of putting a price on water and thus moving it into the realm of tradeable commodity. Some of the implications of that may overshadow the way a price could function as a conservation incentive.
- Mandate municipalities to educate constituents on water issues to gain support and/or acceptance for stringent policy and measures.
- Educate Albertans regarding usage of pesticides, chemicals or fertilizers that can enter and impact the aquatic environment.
- Rescue endangered habitats before we lose them for good. Where's the rescue money going to come from?
- Identify future salinity problems before they occur.
- Identify possible wildlife refuges in this system and extend them with no hunting policy.
- Determine the amount of water needed for the aquatic environment.
- Develop a framework for basin stakeholder groups, such as the Bow River Basin Council, to assist individuals, groups, licensees, etc. to determine how operations can change to meet public and/or ecosystem needs on a voluntary basis. People will often do things out of their public good conscience, in a manner that could not be achieved by government intervention or regulation, and people will choose to do the right thing.
- Alberta Environment has sufficient and qualified ecosystem planners to fulfill this task.
- Do a literature review of appropriate information and apply in the areas needed. I'm sure some of this data already exists.
- Protect and safeguard, rather that 'manage' watersheds.
- Consider the value of controlled flows to aquatic ecosystems.
- Consider low natural stream flows when establishing the degree of protection of aquatic systems.
- We already are short of aquatic water. All aquatic areas in the south [warn] don't eat too many fish, etc.
- Change and review dated regulations concerning water effluent/contaminants levels.
- Maintain water resources such that future generations will enjoy good water in a healthy environment.
- Put the environment's needs before economic.
- Ecosystems are more important than lifestyles. Without a healthy ecosystem, there is no life. If we are planning to live in Alberta for another thousand years, we need to plan for ecosystems, not economies, or there won't be any place to live. No water, no life. We are planning for the long-term, not the next election, we need to put the environment first.
- Balance use with availability.
- We must remember that humans are part of the ecosystem and the environment and that we have needs too. There is a difference between the value of human life and other forms of life.
- Encourage aquatic habitat stewardship and active rehabilitation.
- Determine the effect of agricultural activities and develop regulations to control the damage. Costs to farmers may increase.
- There is a huge environmental liability in the Fort McMurray area with the tailings pond. Methods to deal with these ponds need to be developed.
- Special interest groups (i.e. industrial farms, communal farms) not be given special treatment by government.
- I can see this being carried to extremes possibly. Ducks Unlimited does a great job with wetlands.
- Farmers have preserved sloughs. Developers sometimes incorporate ponds as part of parks successfully - encourage these.
- We must protect our aquatic environment first and develop the economy that can coexist with the water supply available.
- Health of aquatic environment is more important than economic growth or sustainability.

- Pro-actively protect the upper watersheds on the Eastern Slopes from the effects of oil/gas industry, logging and uncontrolled motorized "recreation."
- Construct more off-stream storage reservoirs to hold spring runoff.
- Educate people that a healthy aquatic ecosystem increases the quality of water. Missed opportunities for economic growth in short-term provide long-term stability
- Develop water management plans that protect aquatic ecosystems but look at each problem.
- Determine sensitivity of ecosystems. Some are more resilient than others. They often degrade at an exponential rate. They enhance groundwater supply.
- River basin drainage systems will need to be developed and managed to the point that they can not be in the "natural" state.
- Make large urban centres control and recycle storm sewage water.
- Examine use of water in flood irrigation systems and encourage conversion to closed systems.
- Try to encourage less phosphates or other discharge.
- Use wastewater run-off to develop new aquatic environments for wildlife refuge and water purification.

did not indicate location

- Could aquatic ecosystems be developed much like a gas? Then don't worry about the original site.
- Limit amount of water for personal use.
- The need for a wetland act and other similar acts to be priority when considering industry and development. This also encompasses water quality issues.
- No definition of what these levels are the trade off level is the one to be determined.
- Land use plans should relate to water source and criteria established to protect that source.
- Require a 'no net loss' of aquatic habitat function for all water allocations as is presently required for fish habitat: would apply to wetlands, waterfowl habitat, etc. Would maintain existing wetland habitat, waterfowl populations.
- Restore wetland habitats lost to agriculture, industry and urban development.
- Establish the highest priority for protection of aquatic environments.
- Assure enough for life.
- Human personal use is real culprit. Water transfers do harm. Too slow to accept problems too big to tackle.
- The recreation use of water by boats and jet skis and their effect on the water service.
- Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit industry and economic growth.
- Requires a study of past history of industry, before any changes are made to the present policies.
- This section appears to be written by aquatic biologists to continue their research. While this is not necessarily wrong, most people would not disagree with more research, therefore your answers are likely to be skewed.
- How much contamination comes form over application of fertilizers and chemicals on lawns in urban areas and then washed into the system by over- watering of lawns?
- Investigate the use of irrigation. In the summer of 2001, farms were irrigated on days where winds reached 90km for weeks on end. Consider banning irrigation at excessive wind speeds.
- Determine river bed and shore damage cumulatively from industry.
- Determine river/lake regime, bed and shore damage from recreation (i.e. river boats, ski-doos, 4 wheelers).

Additional Comments

Respondents were given the opportunity to submit any additional thoughts or ideas they may have. These comments are presented in this document. Comments submitted with similar themes have been grouped into the following:

Description
Licencing, allocations
Education, research technologies, monitoring
Economy, water pricing, commodity
Industry, agricultural operations, irrigation
Pollution, enforcement
Methods to promote less water use, efficiency, best practices
Oil and gas wells
Water strategy process, public materials, workbook
Environmental protection, wetlands, watersheds, ecosystems
Sustainable growth, growth vs. protection, balance
Transfers, diversions, storage
Recreation
Government bashing, Water Act, other legislation
General, multi-themed comments

Licencing, allocations

north of Red Deer

- Rural people have had second thoughts about licensing their water wells because they fear this is the first step in taxing or charging for water use.
- We have in some areas of the province already over allocated water as a resource and must revisit/renegotiate all previous industrial allocations. Errors of the past cannot be grandfathered in as necessary errors of our future.
- My greatest concern is how we will effectively allocate water resources to a point where we can be sure we aren't: 1) Doing long-term damage to our water supply (e.g. reducing groundwater levels which are arguably not a renewable resource if no waters are available for recharge) and 2) Damaging aquatic ecosystems and thus losing the natural functions of our environment without it being accounted for.
- Developing water management guidelines that fully allocate water is foolish. Does the system take into account the low flow/level probabilities, or of future human needs? I'm not fully aware of how a water plan is developed. However, allocating water for the maximum present value seems to deny the existence of a potential better future need. Also the first come first served approach should not be for perpetuity. Needs change and the fact that you asked first should not negate a "better" use for the water that can come later. Though assessing "better" will be difficult, it is still worth the effort. However, providing for too short a supply agreement will likely discourage investment, therefore there needs to be some balance between having a secure water agreement and it being so secure that another use is never contemplated.
- Industrial development will always increase to a level of full use of the resource. Divert water and it will all be used. When natural cycles brings floods and droughts, industry will look for a bailout from public funds. All of this reflects poor planning without considering the extreme events. Lowering water consumption to a level below "normal year" levels will result in less damaged watersheds and aquatic life and this raises the quality of life of citizens.
- Pricing of water is a necessity to reduce overall water use and waste. Companies would not hold large (excess) water licenses if they have to pay for them when not using them. Water licenses should not be a 'God given right'. They should be based on sound and prudent use. It is too valuable of a resource to be

'owned' by individuals or companies forever. Water rights should be leased with applicable fees such that conservation/prudent use is 'required' not just encouraged.

- In future allocation, priority or costing schemes, water for domestic use should be considered separately and ahead of that for commercial purposes.
- It is excellent that there is a dialogue on these. My personal goal is to address water issues and provide factual education on water management before we are in a situation of great need and high stress (i.e. we've already blown it). I am confused and unhappy with what I understand of the licensing system for industry and agriculture. From 1894 to 1999 (Water Act) my understanding is that licenses were only required for operations exceeding use of a certain volume of water. As a small agricultural operator since 1913, my family has never exceeded this value and so never applied for a license. Neighbours who have not been in the area as long, but run more intensive operations, have applied for and received licenses. Does this give them priority in water use as their licence will be older, despite the fact that they are not as 'historic' as I would consider my farm? Additionally, how does registration of water for traditional agricultural uses compare to licence? Which one has priority? Finally, why is the quantity of water registered, evaluated based on water use in the years 1996-1998? Given that water use for agriculture fluctuates depending on how much livestock or grain an operator produces, and production depends on fluctuating market prices, 1996-1998 seems a very narrow sampling of years on which to base all future protected water use. There are additional enforcement ramifications using a licensing water management system in times of water shortage. Current legislation indicates that people with junior licenses will not necessarily have protection and would have to cut back in times of shortage. Will a wheat crop go to waste? Will a dairy farmer lose his mil quota because he must sell cows? Perhaps we should not encourage development of such marginal properties. "Cutting back" sounds easy only in theory. Perhaps an allocation method other than licensing and registration could provide a more logical framework for monitoring water resources. An example would be selling a water use quota for each quarter section based on water resources available in the area. Producers needing more water could individually negotiate sharing/purchasing part of a quota from adjacent landowners having a surplus. Whatever decisions the Alberta government makes, I hope that they are adaptable and can allow change as necessary as more information regarding water resources becomes available.
- You do not seem to have explored many alternatives to selling water as a way to increasing better use, or many alternatives to individual approvals and allocations - why not group or sector water allocations - x for petroleum industry, y for agriculture, z for electricity... I did not see any mention of allocations for First Nations or industry that may be located on their lands, or a plan to address this issue.
- The provincial government when encouraging rural Albertans to register their wells and water use assured us the province was not gathering this information to be used to charge for use. We would request that this be honoured. Investment in water conservation/recycling systems and programs would be better than investment in restrictions and inter-basin transfer.
- The government should look carefully at the allocation of water to heavy industry. The amount of water that is pumped out of our river for oil/gas/industry for drilling operations could keep the town of Redwater in water for ½ a year, or support livestock operations for over a year.

Red Deer and south

- Regarding allocation of water supplies. Whether or not we agree on the causes for climate change, we would be very foolish to believe that we can count on present water yields to continue. Alberta's future would be much more secure if we chose not be to become too dependent on river flows that may not be there a few years from now.
- Assignment of too much south Saskatchewan basin water to southern Alberta forcing the Red Deer River to provide an unfair proportion of the 50% going too Saskatchewan.
- 57% of the flow of the Bow and Oldman rivers are allocated for consumptive uses; 14% of the Red Deer is allocated for consumptive uses: decisions for water use in the Bow and Oldman basins must not detrimentally impact the ability of the Red Deer basin from being allocated 50% of its flow for consumptive use within the Red Deer basin.
- The old system of water licensing/water rights in outdated.
- This past summer the Town of Okotoks dealt with low water flow in the Sheep River. In the late fall, a housing development called Crystal Shores obtained access to unused water capacity of another

license. That water was used to begin filling a man-made lake even though the Sheep River flow was still well below average for the time of year. This organization had a temporary license to begin filling the lake but the license had a minimum river flow requirement in it. In this case it is clear the developer did an end run on the Ministry of Environment by using the second license. Granted there was unused capacity, but there was also an extremely low river flow. This should not be allowed, to use water for aesthetics when human and agricultural users are being restricted.

- Future development by allocation of additional water should not be allowed if present licenses will be harmed. Why should one persons economic gain be at the detriment of a person that has contributed to Alberta and has built his operation to be economically viable and will suffer if reduced. The price of moving water is a large enough deterrent to excessive use by users. Additional costs are not needed. We will be put at an economic disadvantage to areas that are not charged fees.
- The current 'first come first served' system for allocation is resulting in significant waste. This is an area where use management is relatively inexpensive. All 'trading' of water allocation should be via the Provincial Government. We don't want water scalpers holding municipalities and other users ransom based on wasteful past allocation. Re-examine and require water allocation holders to re-justify their use based on last conservation and use management.
- All through this workbook, the government keeps saying it has three things it must consider before any water can be allocated to new users. Why? The government can do what it wants. It always has. All these agreements were made before anyone knew what they were doing. The whole workbook is saying this. I get the feeling that because the government doesn't know any answers to most of the questions that it will continue to renew senior licences until it's CASE STUDIES are done. We all know what that means. Well this is one case where if we do nothing the issues will not only go away but dry up and blow away too. I invite you to areas Equinox #107. Of the 4383.6 Lt/Day I'm supposedly using per day I can only account for about 200 Lts. This would say that industry is using the rest. I want my share back. I'll look after it instead of them.
- The notion of allocating licenses on first in time/first in right couples with the ability to sell or trade licenses leads to an artificial cost to business which is ultimately passed on to the consumer - similar to taxi licenses which trade for an obscenely high value in some jurisdictions or milk quotes. lobster fishing licenses etc. There should be fairer and more economically efficient means to allocate a female resources. Nevertheless existing investments must be respected - confiscation of property must be compensated. The entire water strategy needs to factor in the economics of the situation (i.e. river basin transfers may be so costly that all other factors are irrelevant).

did not indicate location

- Poor allocation, poor understanding, bad practice. A look at systems in nature without an advocate spells disaster. Keep present structure and you can expect failure. Learn how to use natural resource in harmony or fail.

Education, research technologies, monitoring

north of Red Deer

- If imposing a fee of some kind on any water user is done, (especially oil and gas) the enforcement of such a thing would be a near impossibility. As a Forest Officer with the Land and Forest Division, I would like to see more transference of water use monitoring back to our department, as Water Resources does not have anywhere near enough people to monitor the issue and usually asks for our field monitoring anyway. A massive amount of water is withdrawn from beaver dams, creeks and rivers every winter in the northwest corner of Alberta, and I believe that transferring more onus on the supervising Forest Officer to enforce water management is beneficial.
- The economy of the rural south in Alberta is heavily dependent on irrigation to support a very large cattle population. This may not be sustainable except on very short-term basis, and is a political situation the Klein government will have trouble dealing with. Most Albertan's (and indeed others) do not understand water very well, including it's chemistry, it's effects on health, it's generally impure state in nature, how it occurs in geological formations, etc. They simply take it for granted as universally available in pristine

condition, everywhere. A massive education campaign is needed. Canada is a young country. We could learn from older societies much larger than we are, what not to do (e.g. China, India, Russia).

- We must start from the ground up. Each party in Alberta must get professionals to run in municipal, provincial and federal elections. Professionals: knowledgeable persons who have worked in the society are the key to wise decisions in government. Having a grade 12 or worse (GED) will not cut it in government. At present, the persons in the provincial government are not knowledgeable enough to make the decisions for the future as they are very easily swayed to make wrong decisions. Wise up Alberta - our lives are at stake.
- Water and forestry are the only two truly renewable resources in Alberta. Their protection must be assured, but that protection must be based on science, and real information to the extent possible. The Province must use all methods necessary to truly educate the public about the facts of the issues, in order to prevent unnecessary limitations on economic growth while still protecting Alberta's renewable resources.
- In general, we presently have reasonably good principles to guide the use of our water resources but it seems they have not heeded in many cases involving existing and new allocation decisions. In addition, there is too little value placed on maintaining our natural ecosystems (or what is left of them). A more clear understanding (by the general public and by regulators) of the dynamics of natural water systems (both surface and sub-surface) is urgently required so that effective regulations can preserve the substantial water resources we have today.
- One of the repeating issues throughout the workbook is the lack of knowledge we have regarding qualities of water and how ecosystems rely on their water sources. I feel that this knowledge should be the foundation of all water management decisions. Without this information we have no idea if our water use is sustainable for even a short period of time. Therefore, we should be focusing on getting this information so we can proceed with the decision making in an informed manner, so that responsible, sustainable water management is attained for the future of Alberta.
- There are many countries around the world that are doing well with their water and it might be a good idea to get their views. As well, there are others down stream that may be interested in this as well.
- I think many people abuse the use of water. Many people think that we have lots of water and we will never run out. Especially people that know water is cheap. It really bothers me when I see people watering their lawns many hours a week. I don't know why the water people use to irrigate or water lawns is the same water we use to drink. It's really difficult to address the water issue since there are just millions of angles and controversy. I would like to see more education and knowledge given out to public. It may or may not change people's views and ethics. I am really for the alternative energy producers such as wind turbines. I think if technology advances now and more, maybe water will not be needed as much.
- It is our responsibility as Albertans to respect and maintain our water resources. I think that educating the general public on our water situation will help us to conserve water and discourage polluting of rivers and lakes.
- Please remember that government and people have to work together right from the start. We have to do something now. Government has to educate the people in Alberta and take responsibility for the environment. Water is running out, Alberta is drying out.
- If there is no water on this planet there is no life. It is every person's responsibility to be educated about the value of this natural resource and to know the best way to conserve it. It is not a "commodity" to be sold to the highest bidder.
- The implementation of a water plan for the Province will require a commitment to monitor these resources, more than has been done in the past. Given the potential for economic limitations and the public desire for healthy lakes and rivers, the government should identify this as a priority and ensure current monitoring programs for water resources are not cut any further, and indeed should be expanded.
- I really think it is important that the government seek out and promote innovative ways to conserve water for future use. Building dams and reservoirs is expensive and may not be sustainable; investment in new technologies, education, and incentive programs may serve us better over the long-term. Think outside the box!

Red Deer and south

- I feel more attention needs to be given to groundwater and not just surface water. The government could work with the private sector companies in compiling this data. The government currently has the well logs of all water wells and there is one private firm that has already done extensive mapping of the groundwater in Alberta – Hydrogeological Consultants Ltd. In Edmonton. Work together and collaborate to complete this. Alberta government needs to cooperate with the federal government and develop a "national" water strategy. Currently there is a National Ad Hoc Committee preparing a paper entitled "A Framework for Collaboration in Groundwater Across Canada." This paper and committee involves members from both levels of government, universities and private industry. One of the strategies being discussed is the inventory of groundwater aquifers. Contact arivera@nrcan.gc.ca for more information. Regarding educating the public (groundwater) the organization, Canadian Ground Water Association, has published fact sheets on different topics and they can be utilized in this area. They recently moved their office and can be contacted at 7522 Aberfeldy Lane, R. R. 2, Bothwell, ON N0P 1C0 Phone 519-847-5714 email: cgwa@brktel.on.ca. There is also the Alberta Water Well Drilling Association P.O. Box 130 Lougheed Alberta T0B 2V0 phone 780-386-2335 email: awwda@telusplanet.net. They have resources of their membership with the expertise in groundwater. I believe government and private industry (groundwater) need to work together to manage and protect our most valuable resource: water.
- Listen to the aquatic "experts" who provide good advice (scientific, land use, etc.) Seems to be a tendency to not incorporate this advice in policy formation/decision making. Incorporate the peer reviewed, sound science that you have already collected into policy formation/decision making/water strategy. Listen to stakeholders from all sides and weigh their concerns against a clearly defined public interest (sustaining clean resources – water – for current and future generations).
- Provide technical and financial support to post secondary research into the full range of water resource management curricula.
- If we are to have any reasonable chance of achieving environmental sustainability, much more should be done by the Government of Alberta to ensure the public understands how lifestyle impacts environmental health. The public should be made aware that there is no strategy, the Government Alberta should look into incorporating this message into every child's formal education from an early age – the payback could be very, very significant. Moreover, the Government of Alberta should pay more attention to its long-term economic planning to limit rampant growth, conserve natural resources, minimize waste, and protect the environment.
- Need to focus on water as the limiting factor. This framework then requires us to work within the ecological sphere, with economy/industry and society's needs having to be understood within the limiting environment. This encourages conservation, and incentives and disincentives (taxes) should be used to control human misuse of environmental/natural resources. More focus on education and incentives/disincentives!
- Initiate scientific water studies, (i.e. non-toxic bacterial survey; what are our waters made up of?
- My husband and I were involved with the water well drilling industry in Alberta for the last 40 years. Our drilling company was even involved in some groundwater drilling and test projects in the early 1960s and 70s under the auspices of the Alberta Research Council. With those reports and the water well reports Alberta Environment has on file, these should provide a good start for mapping Alberta's groundwater sources. We were also extensively involved with the business operations of the Canadian Groundwater Association until my husband's death last December. The CGWA, along with various federal and provincial government departments have, over the last two years, been looking at many aspects of Canada's groundwater. Hopefully, this will lead to better utilization, co-operation and public awareness of groundwater in the future. Groundwater being hidden from view holds many mysteries and appears to be a major untapped water source that needs more investigation. Let Alberta's water strategy take the first step to change that.
- I think it was a great idea to have these public forums. It allows for effective input from a variety of people. One thing I noticed as a 21 year old student from Mount Royal, is that there are very few people here under the age of 35 or 40. I think somehow the next generation needs to be educated and made aware of these issues (this is not the fault of the Alberta Government but society - just a thought).
- Basic information gathering should have been in process years ago. Government should immediately allocate sufficient funds and get on with it. Analysis and decisions should then be made with public input basin by basin. Having a degree or specialization than all members of the public.
- Education to residents of Alberta, industrial and agricultural.

did not indicate location

- Need to come up with some baselines – research is going on so let's use it as a start, but not the beall and end all. Obviously we should have been thinking along these lines of conservation from the beginning, but we can't go back and it is important to make choices to do it now. Water strategy needs to consider other parts of the landscape (range/forests) and land uses. Keep in mind that any decisions made about water will also effect the rest of the landscape and population whether you live upstrean or downstream in the watershed. Individuals want to make changes and a lot have already chosen that watershed approaches are the way to go. But the mistake then is that the "government and industry' are not doing the same! Granted, none of this will work or be worthwhile if people at all levels don't charge their attitudes and become willing to pay for it. Education and awareness is very important.
- I suspect that much of the information already exists, shelved unused, right here in this province. Or if not, might be shared by other provinces/jurisdictions where the study of water systems has been gong on, for longer. Also, my cynical nature leads me to conclude that any number of studies can be done, but the will and resources to actually implement good water management practices may be a long way off. I hope not.
- Education of Alberta's citizens re: water usage is very important. Start by educating children and hopefully they will become responsible adults with regards to water conservation.

Economy, water pricing, commodity

north of Red Deer

- We shouldn't assume that economic growth is inherently good. It only has value to the extent that it enhances quality of life. In my lifetime, many Alberta rivers have gone from being safe to swim in and drink from to being diluted agricultural sewers.
- I believe wetlands need to be protected. They are very important for groundwater recharge and in the process cleanup some of man's pollutants. Work on strategies to reduce water pollution. Industry and agriculture must accept these as the cost of doing business. There should be no acceptable level.
- It seems necessary to put a monetary value on water in order to bring it to the public's attention and in order to get people to use it more wisely. HOWEVER, this government has as its primary interests the economic well-being of businesses and corporations. I fear that this group will benefit from water-pricing, water privatization, distribution, etc., and that their wants will come before the needs of the environment and the people. Who will determine the price of water? I fear it will be corporations. Who will be 'encouraged' through increased costs and taxes to conserve water? I fear it will NOT be the corporations.
- The province has enough economic development. If I wanted to live in a highly populated or industrialized area, I would have left my native province (Alberta) and moved to Vancouver, Montreal or Toronto a long time ago. With growth, the environment and all it's natural components have been, are and always will be the loser. Compromises will always be made to benefit of development and to the loss of the environment and its natural order.
- I have an inner feeling that this information obtained in this workbook is a pre-cursor to charging for water usage. Most questions relate to "charging for water." It all seems to relate to: we need to see where our priorities lie so the government can put a dollar figure on Alberta's water and to obtain who should pay the most. I very much agree with water conservation and to keeping our water "our water." Charging for water will not conserve water; it will just drain average Albertans of money. Big business will still use the same amount of water, as they require it. Again, the average Albertan will just pay more for the product they produce. Government will again shaft rural Albertans.
- Water will indeed be even more of a "limiting factor" on economic growth in the future. It would be utterly stupid to permit expansion of industry and agriculture in southern Alberta. The Palliser Triangle should be allowed to revert to short-grass prairie, and individuals should be encouraged with government assistance to relocate. This will be a hell of a lot cheaper than damming rivers and diverting water from the north to the south.
- Water should not be regarded as a commodity because it is a basic necessity of life itself. Economic development should always be a second priority, and corporate profits should never be a consideration when it comes to safeguarding the quantity and quality of water available for Albertans.

- Do not sell our water to the U.S.
- Our so-called "free market system," both because of its private structure of rewards (salaries, permissible income from market gains, and soon) and its tax structure (under taxation of corporations and the wealthy) results in a horrifying misallocation of wealth. The rich are made increasingly rich and powerful in all times, while the remainder of the population are driven toward wage slavery, in all but the best of times. This is our "trickle down economy" in which all do well only when the economy is being driven so hard and avariciously that the environment of the planet is fatally at risk. So long as the greed of neo-liberal political forces dominates in politics, as it does now throughout Canada at both the provincial and federal levels, the environment will continue to be destroyed. It will not matter how I or anyone else responds to this questionnaire. So long as a "free" market system means a neo-liberal market system, which implies the incredible wastefulness of a "trickle-down" economy, there is no hope for sane water management. The best that wealthy corporations and individuals can do by the poor (in fact, by any but themselves) is deliver a pittance while they burn out the planet. Indeed, it is all they intend to do. Hope is certainly consonant with democracy and a market system, but it is not consonant with the current neo-liberal "free" market system. What neo-liberals mean by freedom is the economic license to accumulate obscene wealth – freedom to exploit the community almost wholly without restraint. All freedom means here is unlimited wealth and power for the few and as little as the market will bear for the gullible many.
- The Province may have to accept that communities such as Medicine Hat will have to limit population growth to water availability - unless attitudes about water consumption and waste drainage change. Your use of 'sustainable economy" in this survey is clearly meant as "economic growth" and so some of the questions are badly phrased and misleading.
- Although wetlands are briefly mentioned they must be part of the water strategy……need to be better profiled. There should be a recognized link between water management and preserving bio-diversity (and future options resulting from aquatic bio-diversity). Water management must recognize the important role water plays to maintaining riparian ecosystems. Taking a watershed and integrated planning approach to managing supply use and quality (and ecosystems) is essential.
- Canada must never suggest the export of water. One government cannot gamble with water. It is a single commodity. No one from other countries be allowed to such water from Canada.
- My concern with charging industry and agriculture for water use, is where will it stop? It do not agree with charging for personal use - we cannot live without water. You cannot monitor how much a person drinks, how much is used for cooking, or how much is used for other uses. You could charge for watering lawns - but how do you monitor that? Unless there is a flat rate per household. And, this will become another form of tax and will be prone to raises that people cannot afford.
- Water should never become a commercial product to be trucked away and sold for a profit by some private company. In Ontario, where this is happening already, some rivers and springs have been drained upsetting the whole ecosystem of that area. It is far-reaching.
- It's important not to overtax our water systems by agricultural and industrial use. Economic growth just for growth's sake is not really for the good of all Albertans, but only for the few involved in these industries.
- We should not assume that economic growth is inherently good.
- In general, It believe that current management plans are short-sighted. We need to think of the future in making our current decisions regarding water use. Also, the price of water needs to increase rapidly.
- No water pipelines to the U.S.
- It am very concerned with the present government's focus on profit rather than the safety of its citizens. Government controls need to be very stringent in order to prevent profit at all costs. Once private industry is involved safety and fair treatment are a secondary concern. We need a great deal of input on water management from private citizens in the rural and urban areas, as well as small businesses who rely on a good water supply (e.g. small farming operations).
- Special consideration should be given to east central Alberta. Water means prosperity and east central Alberta is the only place in Alberta that is not seeing continued growth.
- We have to watch our limits to charges, with the average incomes being low and agriculture income low for their produce, etc., who can afford more charges?
- If we do not protect the environment then the future generations and their use of water that is safe will be put in jeopardy. If that happens then what good will it be to industrial and agricultural users if we do not

have water quality that will sustain human populations. Setting a price for the consumption of water has to be looked at very carefully. If the majority of use comes from industry and intensive agriculture then it may be easy to enforce. Urban centres may also be easy to enforce, but are they a major problem user. Small farms are a difficult place to enforce. As well we have to consider each persons input cost (i.e. a $10-15,000 for a well as opposed to $150 hook up in town or a minimal fee for a license for industrial use). One also has to consider the fact that if industry is charged for water use then there is a problem with water going to the highest bidder, even if that bidder does not reside within the boundaries of Alberta.

- Water should be a provincial public resource and not a private commodity for sale to the highest bidder. Whether it is the sale of water licenses from one individual to another or the sale of water itself to the U.S. - it is wrong.
- NAFTA and water pricing - once water has "value" it is subject to export.

Red Deer and south

- Regarding pricing water for water conservation, I don't think that price will necessarily result in a significant amount of water use reduction, but the (very small) fee for water would make people and industry understand there is a value to the resource and money generated from the price of water could be used for water management initiatives (infrastructure, public education, etc.). The Government must be careful to show that this is not a tax grab but that all dollars generated are put back into the resource.
- It like the idea of selling water to U.S. to pay for water management and ecosystem quality standards. Water can only be rented unless it is injected for oil injection. Fresh water goes into the sea.
- The use of economic incentives and limits is integral to implementing and preserving a balance in our water use. Using a "trickle-down" formula to determine the excess water available for human consumption, and then allowing a market to dictate the price (similar to electricity) would ensure conservation of water for our precious environment, and limit over consumption in other sectors.
- It is clear from reading this workbook that the issues have not been properly thought out prior to posing the questions. On page 6 it states, the water strategy must address the issue of water availability for continued economic growth in Alberta. The implication is that we have to cater to economic growth. I don't think so, and a lot of other Albertans don't think so either. So called economic growth has caused a serious decline in the quality of my life in the last quarter century. The workbook often talks about a sustainable economy. What does this mean? Sustainable growth? We all know growth is not sustainable in the long-term, and is only sustainable in the short-medium term at the expense of the environment. The chickens are already coming home to roost in the form of climate change, as this document implicitly acknowledges.
- Without sufficient water in our ecosystem our economical system will break down - the two are not opposed but act together - we may have to change our economical system toward long-term goals and find that at the same time the ecology and environment and the economy will improve.
- Preserving our water quality and water supply may come at a small cost to current economic growth. However, it will ensure that Alberta remains an area where not only companies can live, but families can live as well. I think water management is incredibly important in maintaining an 'attractive' province in all regards.
- Ultimately, free market forces will have to be used to balance supply and demand. People are hesitant to 'pay' for water now because they fail to see the huge hidden costs that public funds are covering. A privatized system will determine the equilibrium price for water by balancing a reduction in demand with supplies that become cost-effective as prices rise. Conservation and environment are noble causes, but they DO NOT reduce water consumption because there is no immediate impact or feedback. A free market pricing strategy WILL reduce consumption because users in all sectors will see an immediate savings associated with conservation.
- How long has Montana been getting water from Canada? Under what circumstances was it agreed to supply them with water? There has been talk of the U.S. pushing for water in a pipeline from the Canadian north to the states. Who is handling this request in Canada? How is it progressing? The "Free Trade Agreement"- there has been some talk in the past that the U.S. could have access to Canadian water and that Canadians could not say "no." Could someone clarify this for me - exactly what is their/our position on this in the Free Trade Agreement?

- Put a price on water volume and/or size of a licence (i.e. similar to demand and consumption charges for electricity). Price
- Through the process of allocation, transfer of licenses, we should not allow water to become a commodity to be sold on a market. We should be careful not to price water to a point where the ordinary user cannot afford. It's a basic necessity. Bottled water should fall under ??? and Food Act to protect the public. Metering irrigation systems and setting a price will encourage conservation among farmer (irrigators) especially with flood irrigation systems (poor efficiencies).
- If we decide to charge for water consumption we will need to charge everyone. Heavy water users should pay an escalated price to encourage better use. We run a risk if we give government control of all the water resource on management and control of consumption that politics will become involved too deeply and only political friends and contributors will get the new allocations. Albertans have seen this happen all too often.
- I would like to see a levy of a few cents per cubic metre applied to all water used by households on municipal systems or by industry, such that the average household bill would rise by $1-2/month. This money could then be allocated to various R and D and conservation activities. Zero and minimum effluent technologies have been developed for the pulp and paper industry. R and D on expanding these systems to other industries and municipal water works should be undertaken.
- Water should not be for sale especially to other countries.
- If water is to be taxed, there should be a pre-determined amount of water available equally to all Albertans. If any individuals or groups use more than that amount they will be taxed accordingly.
- Before any water is shipped south of the border our needs come before profit.
- Before you charge agriculture for water, you must pay me for all the dugouts I have dug on my property and the cost of my water lines, filter systems and distiller. Water is a necessary commodity and should never be charged for. Water is an act of GOD, just like air and sunshine. The people running the government are a long way from being able to provide us with water if we do run short. Charging for water is just another money grab. Always been a PC, but will never vote for them again.

Industry, agricultural operations, irrigation

north of Red Deer

- Agriculture and its growth in our area are dependent on rain, snow and underground aquifers. As we cannot move our farms, we need protection of our underground and all water supplies. Baseline studies and putting back ecosystems must start now. If agriculture is charged for water, then it must be reflected in production costs, not farmers getting the same price in 2001 per pound of beef as in 1952. We must protect our food chain at all costs and that food chain cannot exist without water. The two fundamentals of life are food and water and both are terribly contaminated with various products caused by greed. Large corporations do not care what happens as long as they receive more than their share of the almighty dollar. We need to get back to basics; food and water for all.
- Irrigation takes most water and has a negative cost benefit ratio. Yet the irrigated fields continue to grow crops, which could be grown elsewhere in the province, with very expensive water. It appears that irrigation causes scarcity of water. To investigate river transfers for the benefit of irrigation would not be a useful exercise. Only if it is for industrial and municipal purposes, it would be worthwhile. To ameliorate water supply, in the event of scarcity, the amount of water allocated to irrigation should be reduced.
- Agricultural producers should be required to use the most water efficient irrigation systems. The enhancements must be undertaken at their cost. Failure to comply will result in the operation not being able to secure a water supply.
- Economic reward does not appear to justify public input and stress on water supplies caused by irrigation. Sustainable practices are needed in that industry before more infrastructure is built to service it. It is most economical to reduce pollution load at the source than to dump it into a water body then treat it again later or live with the damage caused. Industry has to be more responsible for their waste load.
- The consumption of water by the oil and gas sector is conspicuous by its absence in this workbook. It is time to deal with this issue - they are taking water that they don't need - they have other alternatives for

pressuring their wells. Intensive livestock operations need to be restricted, particularly the practice of spreading large amounts of manure - the soil can only absorb and break down a certain amount before it starts to leach into the groundwater. Industrial and agricultural activities should be restricted, in the drier areas of the province, to those activities requiring only the average amount of precipitation received. Agricultural activities should only be encouraged where crops, etc., can tolerate the dry conditions.

- Disagree with Alberta's new directive that industry comes first over protection of natural resources.
- Water conservation is key. Why should we support increased water requirements in southern Alberta for irrigation, oil and gas and intensive livestock operations when that part of the province has never been able to support the water demands? The Palliser Triangle still exists today as it did 100 years ago. I'm not advocating moving people out of water shortage areas. But, it's like the destruction of the fishing industry in Newfoundland - once it's gone, it's a much harder pill to swallow because people's lives are destroyed when they (i.e., everyone in the province) have no chance to make changes rather than making changes pro-actively before it's too late.
- Fresh water from river, lakes or wells should not be used to flood oil fields for production purposes.
- The problem here is unfairness. I can see areas like eastern Alberta getting punished (as usual) while the golden corridor (Highway 2 west) gets special consideration. Secondly, the big problem makers, oil industry and CFOs and large agricultural companies get away with abuse and improper use!
- Oil companies and large farm operations should not be allowed in the province (i.e. oil, "water floods" where the water is totally lost). Large farming operations will eventually cause problems by polluting our groundwater with manure.
- Intensive farming operations should be encouraged to move to water.

Red Deer and south

- What struck me most from your materials is how little we know about groundwater. Yet, we pump millions and millions of gallons of water into the earth to increase oil pressure. This practice is a concern to me. Firstly, if we are using potable water, it's being lost by being taken out of the water cycle. And then once in the earth, where is it going? How does it affect us? Can it ever affect groundwater? It's not oil or tar so presumably it acts differently. We know so little, yet we press on, to what end I am not sure.
- I am not against development. However, economic gains from conservation can be significant as compared to developing new, expensive, potentially ecologically damaging structures to divert or artificially manage water.
- The affect of intensive livestock operations on groundwater and eventually the source water for Red Deer domestic use.
- Alberta is a diverse province based on water allocation. Southern Alberta is in a water deficit because there should be a limit on industrial or agricultural development in these areas or expansion of existing irrigation networks. People in the south kid themselves that their way of life is sustainable and still break up prairie to farm and ranch. The sooner these people realize they live in a desert the better. In the best interest of the people of Alberta and our ecosystems there should be a trend to conserve water not use it as a commodity in a false, unsustainable direction.
- Water is to a valuable to allow it to be given away or wasted. Cities are probably more efficient at generating GDP per liter of water used than certain industrial operations, including irrigation. Therefore, irrigation should not be taxpayer supported. Historically, irrigation may have been important but it appears it is a sunset industry and should not be artificially prolonged.
- Our farm is located beside Lake McGregor and we irrigate 280 acres from the lake. The Bow River irrigation district charges us fees higher than farmers in their district (Vauxhall) even though they use 8-10 times this water through flood irrigation. For the past 2 years, they have drained the lake to fill the southern reservoirs leaving us with no water by July. In the meantime, farmers near Vauxhall boast at the BRID meetings of applying 39 inches of water to their crops. We have asked them to introduce a metering system to make the process more fair and efficient but the BRID has shown contempt for those irrigating from the lake and patronize their local customers.
- It seems to me that there is a major omission in this questionnaire. What about the damage to both underground water and surface water by the oil and gas industry? I would like the issue to be front and centre in all discussions about water in Alberta. Anything less is unacceptable if a satisfactory outcome to water management is to be achieved in Alberta.

- We should not support large amounts of irrigation in areas that cannot support the water requirements. While it sounds harsh for the farmers who need irrigation to keep going, it should not be at the cost of our water supply.
- Severely limit intensive livestock operations. Alberta has too many already in the south part of the province.
- Livestock in riparian areas is one of the most overlooked aspect of water quality and quantity. For example, North of Waterton Park there are several Valley's that have been closed down to off road vehicles (which I agree with) however cattle are still permitted to roam here with virtually no regulation. They erode stream banks, alpine areas and defecate everywhere. Not only in the mountain valleys but also in the foothills. Cattle are permitted to graze all along waterways (riparian areas). There should be legislation so that cattle can have only limited access to waterways or use troughs located away from waterways. The key to water quality and quantity has to start at the beginning, the mountains, you can't solve the problem by fixing things at the end of it. I have answered several water surveys over the past few years and no one seems to be addressing this problem. I feel because the vast majority of public doesn't know it is happening. The ranchers who are using those areas keep quiet because it's a great deal for them to raise their livestock in these areas.
- I live in southern Alberta and I strongly disagree with irrigating land after crops are harvested.
- There needs to be a whole new look taken at what is an economically viable crop here on the prairies. For example, an acre of vegetables produces a much higher rate of return than an acre of barley and uses much less water. It is my feeling that the government needs to put more funds into researching what crops can be grown and sustained using less water, less herbicides, less pesticides, and less chemical fertilizers.
- Would it not be wise to put a weir across the South Saskatchewan River at Medicine Hat, to bring the level of the water up, so as it could be pumped to where it is needed to the south of Medicine Hat and east toward Caven Lake.
- Build a pipeline from the Yukon south to provide the extra water needed for agriculture and human consumption. We build pipelines for oil and gas why can't we build a water pipeline?
- I think the government should seriously consider limiting the size of agricultural operations using a great deal of water. Four years ago we had our well tested and registered and were told it would be good for 20 years at the amount we would need. Shortly after a large feedlot that is quite close to us went into production, we started having water problems. We are now having to haul some water to our barn. I don't think there is any way there will be enough water for the amount of livestock the government wants Alberta to have. Economic growth might have to be controlled so that we can maintain healthy aquatic systems.
- I believe that agricultural users of lakes and streams should pay a nominal fee for irrigation which could go toward studies and information gathering for some of the above.

did not indicate location

- At the end of the process, who's views will be priority? If urban and rural views are in opposition, who's will be picked? What about the impact of the oil industry? Will they be made to be more efficient users? It's doubtful considering the power they have in this province. They need to be accountable for their usage of water. How will this information be used, will it truly be used.

Pollution, enforcement

north of Red Deer

- I feel our present systems, government and private sectors, often blame agriculture for many water problems before we look at urban issues (e.g. putting toxic elements down the sink-paints, chemicals, etc.). Overuse of water: fines should be given out to households that water lawns so heavily that a lot of it runs down the street carrying fertilizers and lawn chemicals with it. Education to households and garden centres on the overuse of phosphate fertilizers in lawns: many households have near toxic levels of phosphate on their lawns due to overuse.

- Ozonating drinking water should be considered as a more effective means of keeping it safe.
- I think we should also look at finding alternatives to the way we clean and process water. I do not drink water straight out of the tap because the chemicals used to treat water make me quite ill. I know of others who suffer the same problems when drinking water from the tap.
- All water users must reduce the amount of phosphates entering the rivers and streams. Threshold limits must be established.
- Alberta Environment must be more proactive in protecting water bodies, streams and watersheds against pollution. In particular, potential polluters such as feedlots and commercial hog farms must be more stringently monitored and controlled to avoid polluting our water sources. This should include controlled livestock access to streams and lake shorelines to avoid bank and shoreline degradation.
- Another issue is that which involves intensive farming of livestock and its contamination of groundwater sources. If we don't have clean quantity and quality of water and air life will cease to exist.
- Give the existing regulations more teeth. Obtain adequate government technical expertise in groundwater and surface water.
- Undertake/publish studies on vulnerability of aquifers. Require proper capping of seismic shot holes. Using bentonite, to preserve contamination of aquifers. Stop seismic holes being drilled in roadside ditches.
- I am against the commodification of water. I do not believe in industrial hog farms; I think they are destroying our precious water supply. I also feel that we aren't putting enough emphasis on protecting our water supply from the ravages of industry and farming. Please keep in mind that water exists to sustain life, not for the health of the economy.
- Many farmers who drew safe drinking water from ground wells 30 years ago must now truck in drinking water. Primarily due to contamination from intensive use of herbicides. The risks to river systems and aquifers from industrial uses seem to be part of public awareness to a far greater extent than the risks from agricultural chemicals.
- Water is a right and should be protected from pollution so it can continue to support life chains.
- Any industry that pollutes or has potential to pollute water and water systems must be monitored closely and be forced to abide by the laws of government environmental agencies. Not policing from internal sources of the industry (which has been proven not to be effective in Alberta's industries).
- A provincial standard should be used for lake side development regarding septic systems and use of lake water. This apparently is decided on by each county/municipality.
- Limit use of chemical pesticides and fertilizer in farming operations. Groundwater is limited and chemical concentrations high in many central Alberta areas. Immediately impose greater regulation on waste disposal and soil/water testing near cattle feedlots and other large-scale agricultural/industrial sited to protect the groundwater.
- I live in Edmonton but I also live/own land in Carrot Creek. There is a cattle farm just up the creek from my place at Carrot Creek (Edson area) and the cattle manure is spread on the land plus the cattle are allowed to relieve themselves in the creek and on the banks of the creek. The oil wells and drilling close by all use the creek water and cause pollution to groundwater and the water wells.
- We have large rivers that move through the province to other areas. We must be able to guarantee that the water we send them is re-usable and safe. Free from toxins or high concentrations of chemicals.
- Important to monitor more closely the contamination of our groundwater and drinking water from both industry and agricultural chemicals.
- I have seen pristine lakes and rivers and water systems of 30 years ago polluted - unable to drink water safely or even swim in it.
- The Alberta Government, the MLAs and employees, surely must be aware of the increasing pollution and the decreasing of water table levels in many areas of Alberta, yet the laws and regulations already in place are not enforced and the government continues to allow industrial and agricultural industries to be established knowing that there will be a further demand for water consumption plus also resulting in surface and groundwater pollution. Unless laws are made and enforced to protect the watersheds, rivers and lakes, from industrial and agricultural polluted runoff, clean water supply will be just a pipedream.
- Livestock needs to be prohibited access to rivers/streams as a water source and replanted with bank-maintaining vegetation. This may already exist but is not being enforced. I'm a rural (private) water

source user and users upstream of our groundwater source need to be strongly monitored. This is a great project if it can be put into effect and enforced.

- We live beside Sturgeon Heights Creek and over the years we have seen this creek slowly deteriorate because of the feedlot up above us. We know it is also polluting Sturgeon Lake as well. All our efforts to local and provincial government personnel have been in vain. Every department we have been referred to tells us 'WHAT' the problem is (we already know that). Our question is what can we do about it and would someone please HELP us? Fish use this creek for spawning but it is getting tougher all the time for them. This creek is filling and filling up with weeds. We have been referred to all departments. We wrote to our MLA who referred us to Lorne Taylor, Minister of Environment, and MD of Greenview #16, Tony Yelnik. Lorne Taylor referred us to Gerry Haekal, Terry Scott, Nico Wyn ???, etc. 'Cow and Fish'. They sent us to Noreen Ambrose who sent us to Kelsey Spietraw (?), who sent us a 'Cow Fish Educational package. WOW! That is where we are now. Next stop is the media (come spring) and perhaps Robert Kennedy!!
- How do you determine whose calculations for amount of substances that won't affect a lake, etc. would be correct - you could have 3 different people with 3 different answers. Would be hard to get everybody to agree to one management plan - if people accept the plan you need money to work on the plan. Need to deal with wastewater. Enforcement of plans.
- Buffer zones around bodies of water should be established to minimize pollution from agriculture e.g. where lake levels rise and fall. No grazing or use of chemicals should be allowed where high water floods the land.
- If we continue to allow agriculture and industry to pollute our rivers and sloughs we will have no water fit for use or human consumption. Water is necessary to sustain life and at the rate we are proceeding, soon a gallon of clean water will be worth more than a gallon of gasoline. Our rivers have been turned into cesspools of human, agricultural and industrial waste.
- A water scientist in this province, Dr. David Schindler, has been recognized by his peers throughout the world for his work in the field of limnology (study of fresh water). Our government has stated that they will use science to determine where CFOs will be sited. Here we have a world-renowned limnologist who could be of immense help regarding this issue, but my understanding is that the government has their own experts! History tell us that CFOs have polluted air, soil and water in many states as well as Manitoba and Saskatchewan. In Scandinavian countries, strict regulations regarding size of these operations and manure handling are providing citizens with confidence in having a secure environment. Here, we invite foreign corporations to set up with "cave man" technology, open sewage lagoons for their hog factories. Under these conditions, I have no hope of our environment being secure from pollution. Although on the surface this "water for life" is an exercise to be commended, I have no confidence in it having much of an effect on properly regulating "industrial agriculture." It's a poorly kept secret that our minister of agriculture has embraced big time agriculture and, unfortunately, in the not too distant future, this well meaning exercise will have been a waste of time and resources. I am a farmer who is very concerned with stewardship of our resources; we owe it to future generations. Good luck with this initiative, we'll need it!
- Being a person who lives in rural Alberta and relies on my own private water system, I am very concerned that my water supply will become contaminated by local farmers in the area because of their farming practices (i.e. spreading of animal waste on fields near large bodies of water). Allowing of industrial pig and cattle farms. The use of sprays that end up in main water basins and rivers.
- It is imperative the government enforce that no one can contaminate groundwater or surface water period. It is cheaper and environmentally "economically smart" to be proactive rather than reactive. Without ensuring a healthy ecological aquatic system the rest breaks down. You cannot support economics with an over-allocated, polluted water system (put a cap on it!) If we do not look after the "natural system" that sustains us, the whole system will break down. We have to accept that there is a limit to what the natural system can support - if you want future generations to be looked after, we must limit growth and development - or we will (future generations) pay the price (e.g. Aral Sea - can we not learn from what has gone on before us?).
- The focus of the questionnaire was on water supply and its quality which is related to wastewater quality and production. However, wastewater issues were not specifically addressed and I think this was an oversight. The onus for water quality should not simply be on the downstream user of potable water supply, but also on upstream producers of wastewater. Issues related to intensive livestock operations

industry (pulp, petroleum, irrigation districts) and municipal sewage treatment are all part of the system and were not addressed. Many quality problems begin at wastewater outflows NOT potable water inflows!

- Something should be done to prevent cottage owners along lakes from dumping raw sewage into the lake (e.g. Moose Lake). Towns along rivers dump poorly treated sewage into the rivers every year (e.g. Vermillion River).

Red Deer and south

- Do we really need more studying of these issues. Let's provide enforcement of the current act and regulations.
- We must balance the use of our water resources, between the individual needs and industrial and large agricultural needs. The largest polluters of the waters should pay the highest fees and the fees should be used to clean up the pollution. The environment is very important; but we allow too much access to oil and gas and lumber that pollute the water close to its source, in areas that are too sensitive to resist the excessive pollution. More areas should be set aside with little or no access to commercial interests.
- It is paramount that the people and resources needed to implement, monitor, and enforce environmental regulations are placed effectively throughout the province. The government must abandon the trend to cut back on the very services that are required to ensure the quality of life and good health of all Albertans. By reducing or eliminating critical public services, the government has effectively "relieved" itself to some degree of responsibility. So who is ultimately "responsible" then??
- Large factory farms producing large amounts of manure (waste) must build their own sewage systems according to regulations.
- It is extremely important that the rural resident does not receive all the incriminations about our water. They are stewards of the land with proper education and training; they will do their job. After all, most have chosen to live in the country and love the land. If a landowner has some incentive to improve his/her situation things will work out. But remember they have to make a living as well!
- The people of Alberta have the right to live in a clean environment. Factory farms can become an environmental disaster if allowed to set up in an uncontrolled system. The following information is from {Readers Digest, June 2001, pages 58/63}: 80,000 hogs produce as much untreated waste as approximately 240,000 people. 18,000 hogs produce as much waste as a city of approximately 60,000 people (the size of City of Red Deer). 25,000 head produce in excess of 50,000 tons of manure a year. They wish to use a lagoon system and spray this waste on the land. The land must be sufficiently large enough to absorb this waste. Manure from factory farms often contains large amounts of heavy metals, lake choking nutrients, and deadly pathogens such as E.coli 0157. According to U.S. studies as many as 70% of all workers employed on hog farms suffer from bronchitis and other respiratory illnesses due to the corrosive nature of hog waste. People living downwind from these hog factories experienced more headaches, running noses, excessive coughing, and diarrhea than residents of a community without hog factories. [From CNN.loc southeast news July 26, 2000]: In July 2000 the world's largest hog producers in Raleigh, North Carolina, announced plans to eliminate open air lagoons and use of waste as fertilizer on their 276 company owned farms in North Carolina within five years. If these companies wish to set up factory farms it must be imperative they also set up their own sewage disposal system like the taxpayers in the city. No free runoff.
- The short-term gain of a developer's tax contribution must not override the long-term impact of development long-term on the environment. I never thought I would have to become an environmentalist. I thought in 1999 a letter to Alberta Environment in Red Deer concerning my land being used as a storm water freeway from the Glennifer Lake Resort, at the Dickson Dam, and the risk of pollutants from the golf course maintenance and effluent irrigation, would result in action. Fortunately the cases of sludge accumulation in Lake Chestermere, Health Canada's concern with human medications in effluent, Walkerton and West on Calgary-the Spring Bank Water Corporation vs. Emerald Lake effluent contamination of groundwater are all helping me back-up my concerns.
- The most important aspect we have to deal with is the pollution of our water. The approval of mega-farms which confine huge numbers of hogs or cattle in a small area is a disaster in waiting. There is no guarantee that poisonous effluents will not enter our groundwater. We must protect our groundwater. Some of our aquifers contain fossil water which might take 10,000 years to fill up. We must have strict

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rules about the use of this water. A huge amount of stream water is pumped down into oil wells to increase the flow of oil. This water in the oil wells is contaminated and is lost forever. In the long run it is better to protect our water than to increase our supply of oil.

- I am somewhat concerned about industrial use of water being on the use of the water and the wastewater after a particular product is made. There has been talk of contamination of groundwater, runoff pollution into lakes and streams from agriculture. Proper enforcement of Alberta's high standards must be maintained. Is there enough enforcement by the government? Enough properly trained personnel for random investigations? What good are the laws if there isn't enough enforcement?
- I believe our Environment Minister L. Taylor should correct the outstanding criminal practices by the Elkwater Hutterites. The Elkwater Hutterites have completely dammed off an existing creek to supply water to the colony base, the creek ends at the colony - it is illegal to completely dam off an entire creek. Elkwater Hutterites have in excess of 72 water licences for their own use (water that is fed from Cypress Hill aquifers). Elkwater Hutterites have an intensive livestock operation such as a dairy, commercial cattle feedlot, pig factory. The effluent is creeping toward Medicine Hat. The elevation of the colony is approximately 2000 feet higher than Medicine Hat. The Ross Creek and it's tributaries are now carrying the manure to the South Saskatchewan River. There was a water loop formed 2 years ago - the Elkwater Lake being the water source. The Elkwater Lake is used by 50,000 people from Medicine Hat as a recreation lake. The lake has been drained at an alarming rate because of the drought. Recreation for our people has been sacrificed for the Elkwater Hutterites (who incidentally have the majority of the water outlets) and cattle operations. This is a gross injustice - our Environment Minister has charged this to political expanding. There is enough water in our district if there was a fair allocation of water. Politics should not enter in water distribution to its citizens. Fence off creeks, springs, river fronts to keep cattle off banks, protect vegetation. Make it illegal to farm land up to the edges of creek, spring, river banks. Make it illegal to spray crops near water bodies of any kind.
- For over 50 years seismic holes have been drilled to depths of 50 to 100 ft and left open, with the runoff from livestock and fertilizers polluting underground. All new and old holes that can be located should be plugged to the bottom. The use of explosive charges should not be allowed on any quarter of land, which has a water well on it. Water wells cost too much to replace and very few oil companies will stand all of the cost. Rural Albertans should never have to pay for groundwater from their own wells. They now stand the cost of drilling, developing, and maintaining the well, as well as the cost of pumps and power.

did not indicate location

- Industrial and agricultural pollution is a serious concern for our welfare. Strict, rigid standards must be in place and enforced.
- We need to respond to citizens' concerns about activities on 'private land.' Where I live Baptiste Creek flows from Baptiste Lake to the Athabasca River. Local landowners had taken down all the trees along this creek. Now the flow has diminished. They supposedly drill the hog industry effluent into the soil. The main field receiving this effluent has a steep slope to Baptiste Creek and the tree cover was removed in 2001. I spoke to Public Lands. The response is, it is private land. Not good enough. We also have a feedlot on the riverbank. Is this good for our water?
- All of the land depends on the waterways as cleaners. We need water, air and food to survive. All the rest is gravy. Let's protect the essentials first. Recreation is a big problem in bank erosion, water pollution and watershed damage. It is non-essential. Consider cutting these uses back first (i.e. 4 wheeling in the west country and huge recreation development around every water body). Where does this sewage go? What about all the fuel discharge from the boats? River boats on the rivers stir up huge sediment and disturb fish spawn. Manage the stuff that won't cost so much first. Untreated sewage or secondary treatment (straining the lumps) from urban areas is unacceptable and could be upgraded without too much trouble. 89% of the lead in rivers is from urban sewage discharge. Take care of that.

Methods to promote less water use, efficiency, best practices

north of Red Deer

- Provide some incentive to capture rainwater from the roofs of houses into backyard storage containers would help reduce demand for landscape watering on municipal water supplies.
- The provincial government must show strong, unbiased leadership on the issues of water conservation.
- Albertans should be educated and made aware that water is a blessed and limited resource in the long run. We should conserve this valuable resource for the future generations even if we have to suffer a bit.
- It bothers me that very little is said about potential conservation of water and yet there are several references to dams and inter-basin transfer. This is a lot like suggesting open heart surgery before we take the cholesterol pills. I don't think large scale - potentially harmful activities should be on the table until we have done something to control our water overuse. This is not just directed at municipalities or agriculture, but industry and all consumptive uses of water.
- Although we need economic development, we need clean water more. Hit the industries harder. Make them more responsible. Educate residents to the benefits of collecting non-consumable water. Look at separating the water processes, industrial use from human consumption use. Why do we waste so much money treating water just to flush it down the drain?
- Water conservation and educating people about the value of conserving water is extremely important. Our society has an extremely wasteful attitude toward our freshwater supply and many people use it frivolously, believing it will not run out. A focus on education to encourage water conservation is necessary.
- Require industry to reuse or use wastewater or water from the same formation instead of using surface water for underground extraction use.
- One advantage of being a technologically advanced society is that, when deemed necessary, we can find ways to achieve the same ends with fewer inputs. In other words, I believe we will find ways to reduce and limit our use of resources such as water if pressured to do so. Of course, technology has limits so, at some point (perhaps now), we will have to accept the idea of sustaining our economy instead facilitating its growth.
- Restricting water usage may be painful in the short-term, but it will force users to develop creative conservation and usage strategies. We must maintain our ecosystem first and foremost.
- Measures that encourage conservation should be reward or punishment based, not voluntary "feel-good" programs. Real incentives must be available. This is more sustainable in the long-term than exploration of new resources.
- Equality should be looked at. All communities should have metered water. Same for agricultural use. User Pay. Encourages sensible use by all parties.
- It have used for the last 28 years a sudsaver washing machine. My first machine I used for 22 years and for 6 years I am on my second machine. Having raised 5 children in the country this machine was manufactured by Sears and was discontinued since 3 years. I always wished they would have advertised this machine more. Everyone was always impressed with my set up. It is so economical. The suds are dumped by the washing machine in a tub next to it, after which the wash gets rinsed with clear water. For the next wash, the machine pumps the suds back in. This way 4 elements of savings. Reuse hot water, reuse of soap, use of tub for cleaning large items (oven racks, pillows etc) with the dumped suds, less soap (I do up to 6 loads with same suds). Note: I am a very clean person and picky with my wash. My hope is that this machine is brought back on the market by Sears or other companies. Sears brought out a new washing machine that uses less water but every load-new hot water and soap.
- This should have been looked into years ago. We never think about the amount of water we waste.
- If Individuals and companies could respect and limit (not waste) existing water supplies, the water problems would be limited.
- So many good environmental practices through Europe and other parts of the world, why not learn and adopt them? Some excellent water-saving products available for consumer-use, but often slow to get to North America (i.e. front-load washing machines), they are too expensive for many to afford. Why not promote water-saving methods and products; give incentives for their adoption and widespread use and make the use of water more expensive, based on quantity used? Individuals mind-sets, attitudes can be

bettered and made more knowledgeable, which will lead to much more conscientious water-use, be it by individual or by business/industry.

- We need to use water wisely. It makes no sense to squander huge amounts of water in order to reap very little benefit. In particular, I am concerned about the vast diversions of water for irrigation purposes in an area not well suited for agriculture (i.e. the SE corner of Alberta). There also is a need to look at the reuse of wastewater for other purposes. We need to cut down the amount of water used by residences.
- I think that government's role is to ensure that industry does not use water indiscriminately. Family farm operations have never been a problem to water supplies and very likely will never become a problem due to the fact that there is an inherent respect for the land and it's resources. You need to be worried about what you are calling "economic growth." Personally It just am not interested in that. Economic growth seems to equate to abuse of the environment. The eastern seaboard of the U.S. should be evidence enough to convince anyone of that. One might say that I'm just a red neck but my pond still supports wildlife and It can drink from it if It choose. That does not happen by accident but rather by taking care not to mess up what nature has provided. It doubt very much that any government can sustain this type of approach because corporate dollars keep parties in power.
- When it comes to our water supply and our environment, we need to get our leading consulates started now. It have not only exterior compulsory water saver, but also interior. People, including children, must learn to conserve water supply not only our generation but for all our tomorrows. It's time to inform our schools, churches and businesses of our environment concerns. I have for the last five years. Call me if you want help.
- As I've stated earlier, we have to learn to use water wisely. We have water associated with almost every aspect of our lives, whereas a century ago water was used for drinking and washing. If need be, we may have to revert back to using water for these essentials if we want to expand our cities and population in general.
- Watering lawns is a waste of water. If there is no rain leave the grass alone. Law should enforce this. Watering gardens is okay. Irrigating crops is okay. There needs to be restrictions on water flow in household taps or a meter on monthly use and some penalties for waste.

Red Deer and south

- I am concerned about the diversion of water to support otherwise not viable operations/communities. It limits growth and viability in other areas with better accessibility to the resource. It wastes energy to transport the water. It poses ecological problems. While politicians are elected to represent people's wishes regarding resources, they are notorious for selling out in the short-term without looking at the real long-term issues. Nowhere in this document do you refer to upgrading environment protection standards to preserve quality. There also is no mention of developing/building technologies to reuse wastewater or upgrade currently non-potable water for semi-potable or potable uses. Not very forward thinking.
- Evaluate. Become more efficient. Inefficient companies do not get a free ride. Companies get incentives to become more efficient with their water uses.
- Integrated watershed management plans need to: include programs/incentives to land managers (farmers and producers) to encourage an adoption of BMP's for sustainable water quality and quantity, a water tax that will provide the funds for education and incentive for watershed management activities, technology transfer of research and development work to the grass roots level - water conservation and address municipal policies toward water (development permits). Some of the questions are very leading.
- Conservation – residents of Alberta should be educated and made aware (from cradle to grave) of the dire need for water conservation to realize how precious our water supply is. More bylaws should be introduced to both urban and rural residents to stop the misuse of our water supply.
- There appears to be a bias in this document in favour of increased infrastructure. That is not the direction we should be going. I am concerned that the Alberta government is not doing enough to reduce demand for water – or to address a key driver: climate change.
- Programs should be focusing on efficient uses of water. We should encourage programs like cows and fish to use co-operation to protect our streams.
- Making the public aware of water conservation should be high priority!
- Danger in applying technology that is inappropriate to the problem. Need to allow for development of a variety of small scale water conservation technologies to encourage response/involvement by individual

citizens. Encouragement needed via tax incentives, house renovation ideas, etc. Community based strategies.

- Alberta has the resources, both ecologically and financially to be a world leader in water quality management and sustainability. People and the environment living, working together to the betterment of all. Alberta therefore has the responsibility to use its financial, educational and environmental resources as a standard for the world. Let's be the ones the others emulate.......
- So long as an appropriate regulatory regime with sufficient incentives and penalties are in place, it is worth considering the contracting out of water services to private or not-for-profit companies, rather than the municipalities. The English model is not ideal, but it does provide some options. The key is to set the public priorities and follow them, regardless of the ownership or operational structure.
- Since pulp mills use a great deal of water, research should be underway to find alternate materials to make paper. Not necessarily all of our needs, but part of what we use. This could cut down on the amount of effluents that are produced by the pulp mills and could limit the amount of water used. We could limit the number of golf courses allowed in a municipality. We could ban outright lakes provided for housing projects by developers. The government should be more responsible and ban such enterprises such as Taiwanese massive pig farms. This would save water and eliminate the effluents produced by such enterprises.
- I believe that good water management is required for a sustainable Alberta. I feel that the bulk of the water being used lies within the agriculture sector. If we (citizens) are being very careful and are conscious (e.g. water meters) about how we use our water, I also believe that agriculture will also need to be monitored ensuring that every drop of water is held with most value.
- I think if we send the message to people that water conservation is an issue we must address now rather than later, we will be taking a step in the right direction.
- I realize this is not a provincial issue but the City of Calgary should not be delaying its requirement of water metering until 2014. Perhaps the province can provide some necessary urging to implement this program sooner.
- I think more solutions need to be made where any individual can help make the difference. I think any solution will come with shared responsibility of everyone (individuals and governments). I think this program is a step in the right direction, it is important to inform and gather many opinions and additional options.
- Some action needs to be taken to encourage existing licence holders to efficiently use the resource. Charging for diversions should be considered when licensees fail to meet best management practices (i.e. they should pay for the volume that is wasted only).
- Limited personal use should be a last resort. Wastefulness should be discouraged and penalized at all levels.
- Is the "volume" of water used by our society in flush toilets a major consideration? If so, is the flush tank design (sige) mainly for mechanical needs? Convenience? If the "volume" deserves due consideration then statistics on the Australian example of a two different volume flush system should be investigated.
- More efficient use of water is essential to sustainability. Rivers should be maintained with adequate water to protect ecosystems. Irrigation systems should be planned so there is normally excess water going down rivers. Adequate supply should be available for drought periods by not allowing short-term over expansion.
- I would like to see the oil company use CO^{22} from coal-fired plants to recharge old oil fields in place of potable water.
- We need a fresh look at water use. What do we use it for? Cooking and drinking - it needs to be pure and fresh - given. Flush toilets - wasteful - we need to design something that is not such an unnecessary waste and contaminant - it's time for a new method. Washing and bathing - needs to be clean and fresh water. Watering gardens, lawns - a waste of potable water - grey water systems, alternate sources - new ways of landscaping. Improve this. Agriculture - most are responsible, but those bulldozing manure onto rivers or otherwise polluting streams should be heavily fined. Industry - those that use potable water without recirculating it and add contaminants to streams or rivers should be forced to lessen their impact - those that use water responsibly should be rewarded.
- I would encourage people to travel in order to form a different perspective on our own water supplies. We should all understand that it is not only our own county that is dealing with water issues, but many

countries are unable to provide safe drinking water at all. Mother nature has supplied the planet with clean fresh water forever, but It feel that we are dangerously close to pushing things too far. People from urban centres need to be educated on how life really works – and nobody can survive without the proper moisture required to grow crops. Agriculture should always have priority; people can go back to the "old ways" of sharing bath water, restricting how often the toilet is flushed, not washing cars or sidewalks every other day. WATER SHOULD BE FREE.

- Companies with green areas on their property, continually water the grass, plus the street everyday. This is a huge waste. Have their sprinkler system come on once a week or less. Homeowners should continually be restricted to watering outdoors on selected days only. Fertilizers used should be labeled as detrimental to the river system. Make city and town homeowners abundantly aware of water wastage (e.g. leaky faucets, watering the street and alley). Make water meters mandatory on all housing and companies, beginning now. Send each household in cities, information on garborators polluting the river, lawn fertilizer damage, mulching and being environmentally friendly; a condensed version of the booklet sent with this survey would work. City people take water much more for granted than rural property owners with wells. Use the media to educate water conservation to the general public.
- Encourage pig barns, milk parlours, slaughterhouses etc. to recycle wastewater which can be reused to wash down floor and facilities.

did not indicate location

- Water is life and should be available to all Albertans for a reasonable price, to be used for drinking, agriculture and industry (especially small industry). However, water is not currently valued by Albertans. The public must be educated in order to encourage conservation at home and at work. Benefits could perhaps be offered to companies and individuals that are improving Alberta by conserving water. When there is no more available water in a watershed area, growth must simply stop in order to maintain the health and success of the people, ecosystem and industry in that area. Bring in water from other watershed areas is not a reasonable solution. Quite simply, there are limits. We would do better to work with these limits than against them.
- Individuals must be made to feel they are a significant part of water conservation. That the key is action now and that we can start in small ways, not waiting for large universal decisions by government. We have done well in awareness about recycling. Water is life and ever more significant. This awareness and promotion could work very well with conserving energy and reducing pollution.
- Alberta has plenty of water. I agree some areas are more endowed than others. However, we Albertans use the water we do have very poorly. Tax incentives and revised building codes can ensure more efficient use of water, as well as public education from kids to seniors. Industry and agriculture can and must become more resourceful in their water management. They are by far the largest users in the province. With the amount of money the government is giving the engineering faculty at the U of A, why can't they churn out more environmental engineers or innovative research in water conservation? Humans are exceptionally creative. WE can discover ways to use our current water more efficiently without diverting rivers, or damming them and destroying irreversibly altering our aquatic ecosystems.

Oil and gas wells

north of Red Deer

- Minimize the amount of freshwater being lost in deep well injection. Determine amounts and where. Set up guidelines for deep-well injection - no freshwater injection.
- Make sure you find out how much good water is going down deep well disposal wells and oil/gas water flood operations. There is more fresh, surface, groundwater going down the "hole" than you probably think.
- One big concern is the oil industry and the water that is pumped into the earth which does not resurface. Making this a non-renewable resource.
- Non-renewable use of water (i.e. to pressurize oil wells and to produce steam for oil sands/heavy oil production) should be prohibited. This includes the use of all surface water and of potable groundwater.

- There is a huge amount of waste in the oil and gas industry that is not being addressed and/or monitored. Drinking water is a pittance in comparison.
- The greatest priority must be accorded preventing oil companies from using water to flood underground oil sources for the purpose of raising the oil level to enable an economical recovery operation. Water so pumped is gone forever. Millions of acre-fields of water have been wasted in this manner with the full acknowledgment of the Alberta Government.

Water strategy process, public materials, workbook

north of Red Deer

- I don't agree with some of the wording in some of the questions (i.e. In Section A, a through j; should use the word "may," as "will" is hypothetical).
- Most options and implications are very leading - is this a fair survey?
- The newspapers would indicate that the government has already made up its mind and any future decisions will be made by election requirements. I am cynical because I am paying the bills for deregulation of electrical power and natural gas. The government will not utilize the information from a consulting firm and certainly not from an individual tax payer.
- I highly commend the province for taking on this task, it is long over due, and I thank you.
- I found some of questions difficult to answer because they did not provide sufficient information, or because they were not clear. A good example of such a question would be the third question under number 10, "Allocate water based on its most beneficial, valued uses." Whose values do you, mean? I would imagine that agriculture, industry, environmental concerns, urban and rural residents would have differing perceptions of "most beneficial, or valued uses." Are you talking about priorities? If so, you could have phrased the question to ask people which use of water should have the highest priority. On page 3, you put healthy sustainable ecosystems at the top of your list.
- You want me to base answers on things I know nothing about. What the heck is the FITFIR rule? It's like a loaded question. Dammed if I do and dammed If I don't.
- I am very pleased to see that input from the public is being considered. I wish this opportunity had been better publicized though. I strongly feel Dr. David Schindler should be involved in the planning of Alberta's water use and management.
- Important that citizens be as involved in this process as industry. Do not feel this was well advertised or promoted to the public. Only one workshop for a city the size of Edmonton makes citizen involvement seem quite insignificant. Survey shows some clear biases. This made it difficult to give valid, worthwhile feedback when answering someone else's questions based on their pre-conceived notions.
- I think it is important for the average public citizen to be informed .This process was poorly advertised to the general public, but probably quite well advertised to industry and the areas that profit from the use and monitoring of our water basins and groundwater.
- I hope to go to the Minister's conference.
- I would like to be involved in the forum to review the public outreach and consultation process. I have lived in Northeast Alberta for the past 40 some years and within my time, I have seen many changes in the environment in our region. I have been a trapper, fisherman for the past 2 decades and some day I may not have any water, so I can set my nets. Hard times are coming and coming fast. Old mighty dollar vs. life. Selling our forest, cutting down our trees, developing more oil plants is not the true answer. Thanks.
- This workshop was too quick and process did not build relationships or take advantage of situation to facilitate constructive, sensitive dialogue between/among participants with various agendas, concerns; current water-related development issues (toward building partnerships). Need for general public to have better understanding of water allocation process, forecasting and technical developments (i.e. more presentation of 'facts' from Environment Department staff – especially specific to our region). Need for specific outreach to First Nations and to join rest of folks in discussions.
- Challenges are overly generalized questions e.g. items 1 - 4 - where?
- I am willing to sit on Minister's Forum.

- Questions are too open-ended.
- Soliciting opinions from a poorly informed public is next to useless! The staffs at the workshops have little scientific expertise. Conspicuous by their absence are AEP's PhD water scientists. Some of the questions are infantile. No thinking scientist has believed the significant removal of water can be made without affecting aquatic life for a half-century. Put an information package done by competent scientists in public hands before soliciting opinions. For example, a-1 Most people don't know that we have 90 years of data for most rivers. Every prairie river and more boreal ones show extreme decreases in flow. People should know this, not be asked for uninformed opinions. This questionnaire is a 'poor design' classic!
- Although significant resources have been put into the creation and publication of this workbook. I urge you to move forward more cautiously and research the ramifications if these ideas come into force and effect. More than anything, we need to not disturb and upset the balance of nature. History bears out that man's best intentions, down the road, create problems that even the most gifted cannot resolve. Playing with nature is fraught with difficulty. Perhaps informing the public in a clearly, less confusing manner would be of benefit. Clearly stated objectives are supposed to result from this workbook, but how can that be when this workbook does not contain any specific directives? Example, the government is considering major inter-basin transfers, selling of water and licensing on a first in time, first in right basis and your license is grandfathered. It see no such clearly stated facts.
- My question is - why was this meeting (Stettler) and also the rest so poorly advertised? Also the timing is very poor - calving season is upon the ranchers. The seasons, weather, etc. does not affect the people presenting these presentations, nor the Politicians, as they are paid regardless. I believe this workbook is misleading - Mr. Taylor and Mr. Klein are apparently not "singing from the same song sheet." There are three key and extremely controversial questions that test a persons opinions on water issues. This workbook is worded extremely vague. I feel most uncomfortable answering these questions. This workbook is very similar to a child's grade one workbook - very vague, and there is only one answer to the questions.
- The ideas group's 4th fundamental objective: to ensure Alberta has the knowledge necessary to make effective water management decisions - has been barely addressed in this booklet at all. River basin plans should be a top priority - they aren't mentioned here. What priority does AE give to data gathering, data analysis, watershed and river basin planning? Not much - and look what we get! A water management strategy based on poor scientific information, and a misdirected set of booklet questions and no real plans!
- Your authors should be ashamed of their short-sightedness in creating this milestone workbook document. Slightly over 2 pages of 10 are devoted to the two most important topics in this booklet. The "water conservation" and "healthy ecosystem" sections are poorly thought out and suggest that the authors and editors barely knew anything about what they were writing. This is not rocket science! It is basic ecology and ecosystem management.
- The Water for Life facts and information booklet was fairly well done. It was a bit thin and absent regarding values of rivers and lakes and riparian areas (importance of wetlands was brief but well done) - a significant shortcoming in view of the pressures for additional use of lakes and rivers. I do not work for AE.
- There should be a time limit as to how long a person can speak on a topic. Participants should be reminded to stick to the topic at hand.
- I disagree with the process being used to consult Albertans on this important topic. I think the water strategy consultation process is terrible.

Red Deer and south

- Without water we cannot survive!! With poor water control we may well kill ourselves. Thanks for the opportunity to express my concerns. Sorry I am such a computer spoiler but to circle the answer is not good enough.
- Please list in a news release or on the Internet all 60 to 80 invited Albertans and experts asked to review all inputs and to discuss steps and solutions. One of these invited people must be Dr. David Schindler, renowned scientist from the U. of A. Solutions must include restoring and conserving wetlands and riparian areas and strategies to encourage private landowners to do so. Cows and Fish Program in ASRD

and Living by Water Program are two agencies actively involved in promoting healthy aquatic and riparian habitats. They must be involved. Educate the public and school students on water conservation through the Public Education and Outreach Branch, Innovations Division of Alberta Environment.

- I really appreciated the workshop I attended in Red Deer. I certainly became aware of some of the many issues facing those who make policy. It's not easy.
- These questions were difficult to answer in that if I said yes I agree with maximum amount of phosphate (for example) then does that mean we will up the phosphate to meet the amount? These questions were poor.
- This workbook carefully steers those who use it away from offering their opinions on such important and often contentious issues as fresh water oil floods, expansion of irrigation farming, wetlands and preservation and restoration, the effects of ILOS on the quality of surface and groundwater, the effects of the bottled water industry (scam) on aquifers, the effects of clear cut logging and oil/gas development in wilderness areas, i.e. watersheds and the use of Alberta Environment as a tool of the economic/political elite rather than a servant of the environment and the common good.
- I believe this workbook is misleading as Lorne Taylor apparently did not bring the Premier up to speed before making his "everything's on the table" announcement and as there are three key and extremely controversial questions that test Albertan's opinions on the water issues, I feel that I could be led "down the garden path" by answering questions that are so vaguely worded. I feel most uncomfortable participating in general with "workbooks that reflect the public's interest" as on Bill 31, 1999 such an extremely low number of people responded. Why? Well, I didn't know about the meeting and to get to this meeting, I made several phone calls before someone in the Caroline area could answer my question, "Why was this meeting so poorly advertised?" It was not in my local paper nor is tomorrow's meeting in Hanna which would have been closer for me than coming to Stettler.
- This is a 'critical' time for Alberta to learn, understand and appreciate all aspects related to water as a resource. This is an example of a 'rainy day' issue that should be considered emergent. Enough, that suitable programs (e.g. regional water systems, storm water treatment, etc.) should be funded from Heritage Fund. Nothing could be more important now or in the future. The old saying "An ounce of prevention is worth a pound of cure" is very appropriate. Now is the time to spend what it will take to develop a solid plan, not wait until it hits us over the head when costs will be that much more.
- Your "Establish water conservation incentives" is followed by what I believe is a spelling error, as is the case in some other questions posed, seems very unprofessional to me.
- I stopped the survey when I realized that I was not impressed with the grammar and wording of the questions!
- Talk to the people! More workshops and have ongoing articles in newspaper as this effort proceed to build up support from the people.
- I am embarrassed for whoever put this questionnaire together. My grade 4 son could have written down such obvious questions. Why didn't you challenge the well issues of industry and agriculture?? Shame on you.
- I am submitting this with some very serious reservations! The check box response could be used in a very misleading way, IF it is not taken in context of the written notes. I am almost reluctant to participate in surveys from this government – because I have almost always found that they are constructed such that the responses can be skewed to a particular outcome if taken only at face value. The thoughts and ideas which qualify people's responses are the most important.
- With the formation of the "Bow River Basin Council" and the "Elbow River Watershed Partnership" a very positive situation is developing where all stakeholder can get together and work through our current and future challenges. When meetings begin with a handshake instead of finger pointing you will find that everyone will want to participate in the process. The "water for life" facts and information on water in Alberta booklet is a fantastic document. Thank you for the opportunity to be involved.
- I found the questionnaire quite leading. There was little mention of urban growth, water quality. Given how the questions were worded, it was very difficult to interpret their intent.
- Too much ambiguity in some questions. Not enough time. Good workshop and great facilitator.
- Why did Ducks Unlimited have to send out a suggestion sheet on how to answer the questions? If Ducks Unlimited feels that we as humans are not able to answer the questions with our own brains, why even send out the questionnaire? In all honesty, my wife took one look at this suggestion sheet and all she

said was, "Is Ducks Unlimited a cult?" I have to agree with her because it seems as though they are trying to persuade everyone to follow their lead.

- I believe this questionnaire to be a step in the right direction. Being that I come from a rural background and that I work in the environmental/agricultural sector, I feel directly related to these issues.
- This survey focuses too much on the economy and not as much on the environment. If we do not protect the environment, we will face greater economic loss in the future. We need to start putting environment before the economy. I believe that this survey is a good awareness about water shortage.
- Got people "public" to put forth the questions/concerns they have. Good to see discussion taking place.
- Invest in drip irrigation and other new technologies. Limit amount of water that evaporates between source and destination. Allow river to operate naturally, within reason. As the ecosystems have evolved and are evolving to deal with the water conditions (spring floods/summer droughts).
- Throughout this pamphlet you have used a variety of terms, supposedly relating to the same topic. Specifically "aquatic ecosystem, aquatic habitat and aquatic environment." however, these are all very different situations. For clarity, keep all the terminology the same.
- I found that this workbook and its questions are poorly organized and developed. It seems to me that you developed it in hope of obtaining an already known outcome.
- The process of arriving at the conclusion is most important. Setting the withdrawal limits into law for the various basins will at some point be necessary, as that will effectively force adaptation and conservation because growth of population will continue for a long time to come. CWRA IS THE ORGANIZATION WITH THE BROADEST BASE OF WATER-AWARE PEOPLE IN THE PROVINCE.
- The government's planning process is not clear. We have river basin plans being developed, a dam proposal being assessed, regional land use plans, and now this effort coming out of nowhere. How do they relate?
- This information was received without enough time to plan to get to the meeting. It appears the timelines are too close to get good solid community input.
- Very interesting. Thanks for a chance to participate.
- I have lived adjacent to Pine Lake for 55 years, and have seen increased development around the lake, also the establishment of regional landfill in the watershed of Pine Lake. Then years of opposition to this Landfill by the Concerned Citizens of Pine Lake has gained no support from Alberta Government or Alberta Environment. Therefore I cannot fill in this questionnaire with any hope of positive results. This questionnaire was obviously designed by a professional consulting group posing highly technical questions. The average Alberta citizen would need professional help to adequately answer these questions, therefore I've only answered a very few that touch me personally.
- The province needs to reconsider "public consultation." This series was not effective; e.g. announced only days before it began, no advertising (as far as I know) in common media, newspapers. No real opportunity for feedback, meetings were not effective, surveys are leading (i.e. the nature of the questions are such that the preconceived answers are the ones the government will get. In other words the government has decided already what they want to hear and ask the right questions to make sure that they want to hear it). Is there going to be any effort to confirm the truth of statements made by people?
- The facts booklet, while providing much good basic information was used to slip propaganda in amongst the facts, particularly in promoting dams as the government's Godlike improvements on a lacking nature, rather than as massive destroyers of crucial natural areas that are grotesquely expensive and serve primarily to pop up the egos of politicians and engineers. On page 11, the dreadful consumption of water by the oil and gas industry is glossed over. On page 12, you fail to note that regulation would do a lot to protect wetlands. Education is likely not enough. Page 14 says all wetlands are public property - therefore they must be protected. Period. From contamination as well as elimination. The starry-eyed comment on page 37 about analyzing everything before building dams, is as you well know, hogwash. On page 4 you refer to glaciers without saying how desperately fast they are retreating.
- This is seriously biased. For example, the first six challenges, no one can answer these.
- There is an underlying premise or theme throughout the survey which is troubling and misleading. That is: water resources and economic growth are of comparable value and we can choose which of them to prioritize or pursue. Even in an age and jurisdictions consumed with technology and progress, we must face some realities and limitation on natural resources, likely accelerated climate change etc. Water

protection comes before commercial interests in every case. Further, water does not "belong" to anyone and must not be corporatised. Any "right" to water must rest with people before companies.

- We would have had better public participation if the public meetings had been advertised...at all. The public forum as set up lends itself to a process where interest groups can affect the results/comments at certain sessions. The water strategy must consider the use of water as a system. There needs to be a serious collaboration between surface water and groundwater supplies. We need to examine the possibility of reducing our allocations to Saskatchewan to provide more development potential.

did not indicate location

- It is really important to study this issue. Hopefully the study will not run a ridiculous price tag - as they do federally. Hopefully it will have some substance to it. Do not rush into - as in the Mazinkowski report. It contained some good things - not everything needed to be acted on and certainly some things should have taken more time. Do not do that with this water study.
- Question 1c is very poorly worded.
- Some of the options presented very "techy." I found it long, but useful. Good Luck!
- While sitting, listening and completing this questionnaire, I feel that as one woman stated, many of these questions are leading, as are many questionnaires. It seems to direct toward one group or the other rather than as a whole. The discussion however, does allow both sides to share their concerns (with direct interest from the government).

Environmental protection, wetlands, watersheds, ecosystems

north of Red Deer

- Care must be taken to ensure wetlands are protected, not drained, etc. Wetlands are the critical component in the life cycle. The government must recognize wetlands and watershed areas are most important to the health of the environment.
- Leave the rivers alone would be the best policy
- Water needs to be protected in this province. We have very little fresh water and we have the weakest laws protecting something all life forms need to survive. Make the laws tougher and make all users pay a fee for what they will use. Abusers will soon slow down on wasting this important natural resource.
- When it comes to water and wetlands, we must not only protect what we have but also try to recover what has been destroyed in the past.
- Wetlands are extremely important to a healthy environment. Any wetland lost to beneficial development should/must be replaced. This provincial water strategy must recognize wetlands and watersheds for their importance to a health environment.
- Watersheds, wetlands, lakes, streams, groundwater, and rivers are all linked and are critical to healthy environmental functioning. In the past, wetlands have been drained with associated costs to the environment and society. There have also been reduced economic value and lost aesthetic value from wetland drainage. Losses in wetland quantity and function should be stopped.
- If any wetlands are lost to economically viable developments it should be replaced in another location to maintain the net wetlands.
- We need also to stop the draining of sloughs throughout Alberta. Part of the reason for drought, is that there is not near as much surface area of water to evaporate. This decreases in evaporation and has lead to a decrease in rainfall and therefore less water. In my area oil companies have drained ditches, sloughs, dugouts, creeks, etc. just to pump this water down wells where we will never see it again.
- Wetlands are essential...they should be protected by legislation.
- Wetlands are extremely important in any ecosystem. They reduce the severity of floods, aid in groundwater recharge, help to purify surface water by trapping agricultural herbicides and waste and provide necessary habitat for waterfowl, shorebirds and animals. I feel it is very important that we do NOT lose any more wetlands. If it is absolutely necessary, due to some development, that a wetland be destroyed, then the developer must be forced to replace if by restoring some previously drained wetland. Alberta's wetlands must be protected by provincial government legislation.

- There is no more important resource. In my opinion the draining of wetlands and lack of management of riparian zones over the last century are the most critical problems to address. If we don't manage and sustain our watersheds and wetlands - this whole question will become academic.
- The government must recognize the importance of wetlands and watersheds to a healthy environment through the development of the provincial water strategy. Wetlands help to purify surface water. Wetlands must be protected by legislation. Where loss of wetlands is necessary for development, these wetlands should be replaced - a sustainable environment is necessary for a sustainable economy.
- Point source testing is often inadequate. Long-term liquid waste disposal around lakes and rivers can result in long-term damages that don't show up for years A rational common sense water management strategy is required. Science is often years behind anecdotal evidence, and often the environmental changes we observe have occurred before the intervention of man. Much of the damage that is occurring to our water resources today, will continue for years due to the pent up inertia in the systems and pollutants. Polluted sediments will take years (millennia) before they are neutralized. Pollution spills will migrate through the soils and water tables for hundreds of years and cause damage for hundreds of years. Water management and land management can start to mitigate the damages, but much of the damage done can never be corrected. Man and the ecosystem will have to adapt to what we have done. We need to start protecting our environment for future generations now.
- Alberta has reached the point where we have to put environmental protection ahead of economic development. We have to encourage and educate our residents, rural and urban, to restore and protect our wetlands and aquatic environments. We cannot allow every slough and pot hole to be drained or every square foot of property to be paved or developed for houses and industry.
- The government must recognize wetlands and watersheds and their importance to a healthy environment with a provincial water strategy. Wetland loss means decreased amounts of groundwater. The water strategy must protect wetlands by legislation. Wetlands and watersheds must be maintained as they significantly affect water quality and quantity. The provincial water strategy should provide the framework for restoration of drained wetland habitat to rebuild healthy watersheds.
- Two major issues that need to be faced to ensure there is optimum water supply for the future are: expanded and enhanced protection of the headwaters of major rivers and to address the growing destruction of aquatic environments on private land. Currently private land owners can fill in wetlands, clear land for agriculture development or logging up to a river and lake edges and build homes on the flood plains of streams and rivers. To find a viable solution to Alberta's present and future water problems, watersheds and watercourses must be protected regardless whether it is on private or Crown land, regardless whether the perpetrators are small farmers and ranchers or big industry. All Albertans must be held accountable for their impact (small or large) on the aquatic environment.
- If we want to maintain the environment and the economy, we must have a sustainable environment, and a plan in place. By having legislation in place to protect wetlands, Alberta will ensure nature's cleansing process will continue.
- Conservation of the resource and the maintenance of ecosystems must be a priority. Water is needed to sustain life, and we need to be very proactive with its management.
- The issue is protecting ecosystems, period. Not just aquatic ecosystems. A watershed management plan looks to balance the "health" if all ecosystems including aquatic with human needs/demands. The environment and its integrity underpins all human constructs. We cannot have sustainable economics if we do not have sustainable ecosystems.
- I firmly believe future wars will be fought for water. We are much better off than most of the world, but we must start now to protect this precious resource for future generations.
- Our high profile politicians (e.g. Premier, Environment Minister) should provide strong leadership and a strong example regarding matters related to protecting our environment. For example, I read the headline in the Edmonton Journal "Premier blasts Kyoto." I have lost confidence and trust in our politicians to act responsibly and make sound decisions regarding the maintenance of our environment for all Albertans. I am very worried, frightened for the future, feeling somewhat hopeless and becoming increasingly angry.
- It is very important that the Alberta government recognize the value of preserving and recreating wetlands and watersheds. Wetlands should be protected by legislation with recognition to landowners and also consequences to abusers.

- The future needs of the people of Alberta and our environment should be our first priority.
- In-stream flow needs MUST be a top priority, as this is the basis for human dependence and sustainability of our environment. ONLY in emergency situations (that could involve human life or death) should IFN be compromised.
- Plan for effects of shrinking glaciers 10 to 30 years into the future.
- Sustained economic growth is dependent on a healthy environment. If the environment is degraded, the economy will not sustain itself in the long run. Watersheds include all water sources including wetlands and riparian habitats, not just the water itself. Our water supply depends upon healthy riparian habitats are wetland areas. We have a responsibility to protect and restore our wetland riparian habitats for future generations of people and wildlife!
- A few more parks should be set up as natural sanctuaries for birds and beasts.
- Maintain wetlands – they effect quality and quantity in lakes, rivers and aquifers. We need legislation to protect wetlands.
- I feel that our government has rushed (past 30 years) into resource development, agriculture developments etc. which will cause future generations to spend vast amounts on remediation, retrofits etc. We seem to have learned very little from jurisdictions such as England, Europe and others. I personally find it difficult to believe that Alberta will put environmental protection ahead of it's wild-west approach to massive resource and agriculture development projects.
- Any diversion or major storage projects in the Peace and Athabasca watersheds will be vigorously opposed by forward-thinking people. Federal legislation (navigable waterways, fisheries), Wood Buffalo National Park, NWT government, Treaty 8 First Nations, and worldwide environmental groups will all be willing to invest considerable resources to the struggle to protect our future in northern Alberta and NWT. The Peace River Delta is a World Heritage Site and is inside a National Park. The Athabasca River is a RAMSAR site and most of it is within Chipewyan Reserve 201. The Athabasca River has been designated a Heritage River. I expect the current government will try to ignore these designations and jurisdictions. If the climate does warm as dramatically as predicted, and the southern part of Alberta happens to become a desert, then it is the north with its vast resources and ample water supply which is Alberta's future. I am totally against any provision of more water for irrigation in the arid regions of the province. It will be easier, cheaper, and wiser for future generations if the irrigation farmers are assisted to relocate as their land becomes less suitable for farming.
- Water use must be based on long-term sustainability. Watershed diversions should not happen.
- Must work out system that will work for all users: environment foremost; knowledge and study of alternatives: Options what are they? Cost now and later. Enforcement of regulations. Start cost now to help for future.
- Current farm economics force them to drain wetlands. If prices go up they will drain them. Owners of wetlands and riparian areas must receive tax incentives to maintain or improve these areas if our surface and groundwater resources are to be sustainable. At the current rate there will be little groundwater in central/southern Alberta in 30 years. Government has to increase resources of awareness of these critical areas and change taxation to recognize this. Dams, channels and ditches will not help our environment or our communities. Allowing natural systems to work for us will enable rural people to live on the land.

Red Deer and south

- We seem to treat wetlands with disdain and certainly without thought. Red Deer College has a small wetland along 32nd Street. While small, it certainly appeared healthy. Now two huge dirt stock piles stand at the ready. Why? The land is not being developed. It's merely a piece of some farmland rented out by the college.
- There has been no mention of wet lands. In order to keep water safe, wetlands filter the water and with no protection water life will be at risk.
- Because wetlands and healthy watersheds contribute to groundwater recharge by soaking up surface water and allowing the ground to filter it, loss of wetlands will equate to decreased amounts of clean groundwater. The water strategy needs to address the importance of wetlands to groundwater. Wetlands also reduce the severity of floods by retaining water and releasing it slowly. They protect shorelines from erosion by slowing the flow of water and covering the crest of rivers and streams during periods of heavy runoffs (spring and after large storms). The water strategy needs to address the value of wetlands for

flood control. Wetlands should be protected by legislation. A sustainable environment is necessary for a sustainable economy. Albertans will have to plan carefully to ensure both environment and economy can be maintained.

- Reward private landowners for maintaining wetlands (tax relief). Wetlands are our life's blood – should be protected by legislation. If developments sacrifice a wetland for their benefit they should be forced to develop new wetlands elsewhere. Protect existing wetlands – restore previously drained wetlands.
- Oil, gas and agriculture are all identified as water users. Let's differentiate between those industries that use and return water and those that use and don't. Sand and gravel companies take aquifers (active and abandoned) away. Reclamation end use is predictably stock water pond. It is insulting and misrepresenting the truth. Livestock couldn't possibly drink the volumes of water left as "ponds" and as their location is usually beside a river, in a flood plain, it is obvious it probably isn't wise. Duck habitat? What do the ducks eat? How many do we need? Sand and gravel excavation should be assessed as cumulative, irreversible damage and enforcement, monitoring should be applied to an industry that until now has slipped through. The radar being neither "mines" nor a 'surface" activity. You can't remove topsoil to the detriment of the land and water. How can you ruin aquifers and leave giant scars? Water protection is supposed to be so important. Identify this damage.
- Some water management practices of the past will need to be undone to establish natural sustainable aquatic ecosystem. Specifically, wet areas drained for agricultural or other activities that may not have had a net positive benefit.
- Wetlands and watersheds should be protected by legislation. Should maintain balance between sustainable environment and sustainable economy. Wetlands lost to "needed development" should be replaced by developing new wetlands.
- Do not underestimate the ability of aquatic environments to adapt to new situations. We need intelligent compromises on all fronts. It is not always (if ever) black and white. Necessity is the "mother" of invention and all stakeholders need to work together. River systems will change and compromise will be required. But lets keep the rivers and lakes alive and clean using the knowledge of management and science. Man is part of the environment and our needs to live have to be part of the equation.
- Water management must be done with long-term objectives and strategy. That means always think of next generation. One assumption is safe; it is good for the ecosystem, it will be good for the next generation.
- I am very glad to see that the province has decided to create an overall water strategy. All past practices must be considered. It is very bad that when during dry years farmers are allowed to withdraw a fixed amount of water from a river when fish are dying downstream due to heat stress and lack of water. Alberta's foothills streams are very special and deserve a very high degree of protection. They are pure precious silver threads of life that run from mountains to the plains. Fifty years from now will Japanese and European tourists still be coming if we have channels of sludge between deforested over grazed hills? And will Calgary still have some of the best water in the world?
- Can we as Albertans rise above the mediocrity and nonsense (i.e. bringing water from other watersheds) and really consider the implications. Let's become leaders in water use, let's think globally and not forget about the entire water cycle and watershed not just what comes out of our tap. Water is such a precious, precious resource.
- I think that the environment is the most important thing and that the Alberta Government needs to put the environment's needs first. I think that the Alberta Government should get an Environment Minister that is more concerned with the environment than economic growth.
- Aquatic ecosystem is our best monitor of a healthy and sustainable environment. Therefore, the aquatic ecosystem must be our first priority – followed by our responsibility to downstream users (i.e. Saskatchewan, Manitoba) and lastly what is excess to these can be allocated/licensed to other users. Water use is purely a capacity issue, any excess can be allocated elsewhere (but restricted to its own watershed). I believe water diversion is mismanaged in this province. I do not concur that humans come first and ongoing growth is a good thing. A dam in the prairies or various sites in the prairies should be acceptable but I don't trust the government to properly implement this (i.e. the Old man River Dam is my case in point!).
- Very little emphasis has been put upon the source of our water. The great majority of this comes from the mountains and foothills. A healthy ecosystem with intact forests affects water quality (water is intercepted

during wet periods and slowly released during dry periods) and quality (due to filtration through trees, vegetation, soil, etc.). Clear cut forestry in the foothills (e.g. Kananaskis Country FMA) severely compromises these effects. A move to less intensive forestry practices would have important water quality and quantity implications. It is acknowledged that climate change is affecting water supplies: why is Alberta fighting so hard against the Kyoto Accord, which is trying to reduce greenhouse gases which cause these problems?

- I firmly believe that, as the world inexorably screws up the environment, that healthy ecosystems will eventually become the most valuable resources on the planet. The time frame for this to occur is really the only question in my mind.
- Today's youth are paying for the irresponsible past. This is analogous to irresponsible water use today for short-term gains. Also, taking care of our ecosystems is not only good to preserve many species of animals and plants but will have serious human implications as well if it is not done. The health of these systems will be a measure of our health. The health of our environment should have a much stronger weighting of importance that economic considerations.
- Integrity of watersheds for long-term sustainability is paramount. Value of ecological and aquatic environments is integral to a healthy watershed/groundwater regime and should be fully considered at all times. The value judgement of society concerning "luxury" uses should never jeopardize the above.
- One must be wary of environmentalists getting carried away with authority to limit economic growth by extrapolating laboratory conditions to ecosystems.
- Humans are an integral part of the environment, we have an obligation to ensure the welfare of all life on earth.
- Stop clear cutting and development of eastern slopes, protect this watershed. Better management of what we have. Too many agencies involved and no one in charge (e.g. Tyrell Lake). Too much water (e.g. fall irrigation while reservoirs going dry). Should set priorities (e.g. Ridge Reservoir, Chin Lake, St. Mary's Dam).
- Water resource management starts with a wide focus at a watershed basin level. Changes and decisions need to be made from an impartial angle in such a way as to maximize the benefit for the water resource. Plans and decisions have to be made with short-term implementations focused on long-term results. Reacting to instant stimuli and political or public favor can often lead to unpredicted results. A water use strategy needs to focus on maintaining and improving the water resource quality and quantity in a flexible and environmentally responsible way.
- We have to put the integrity of the natural environment ahead of the economy, where the economy means sending profits to Japan or the U.S. So quit sucking up to natural resource development companies and start playing a leadership role in preserving what little is left of the natural environment. We can't know enough about the role of, for example, the boreal forest in water quality and water availability, so it behooves us to preserve what we don't understand. The cost of making mistakes in the name of "progress" is likely going to be unbearable.
- We should not drain our small sloughs and lakes. Also, farmers should be encouraged to build dams and dugouts to hold spring runoff. The more open water ways and lakes there are, the more chance of rainfall. Water attracts rainfall. Also, I have kept moisture records for 40 years and notice there is a cycle of good moisture years and a cycle of poor moisture years - the cycle seems to run in 7 year cycles. This is very easy to predict.
- Government should also provide and address the need for wildlife habitat.
- It's time to protect wetlands – any further draining should be legislated illegal!! Environment concerns over water must be addressed by the Provincial Government. If suitable water does not exist for industrial growth – then there should not be industrial growth. Wetlands must be protected by legislation.
- If the water supply in Alberta is not protected we will have nothing for our future. The future of Alberta depends on a healthy water environment. We must accept that economic growth is not our number one priority. If the provincial government does not protect the water supply from overuse by industry (including agricultural), the Province will have to answer to the people why there is not water and why the water supply is polluted. The economic cost of protecting the water against overuse is far less than the economic cost of not protecting. Don't sell out to industrial and agriculture pressure. Alberta has existed and prospered before "water concerns" and we will continue to prosper - while our water is protected.
- For our ecosystems to survive, the rules must be the same for the natives as the non-natives.

- Watershed protection is key to having safe drinking water for humans and animals. The province has done nothing to ensure this in areas such as Waiporous north of the Ghost Reservoir – a shameless piece of inaction. McLean Creek is another watershed area west of the Elbow River where logging, cattle and ATV users have damaged the area almost beyond recognition. This will be costly in the long-term both financially to filter and treat the water and ecologically to restore the watershed. The concept of learning to live within environmental limits will have to be introduced at sometime to continue to irrigate crops in the arid conditions of southern Alberta, defying nature. We do not have ultimate control of these things, despite engineering attempts that appear to make the deserts green for a short time.
- I encourage the Province to recognize the role of wetlands and watersheds in a healthy environment. I encourage that wetland 'lost' to development be replaced. Ideally, no 'net loss' for wetlands should occur and they should be protected. We must address issues of water with watershed and wetland rebuilding in mind and the maintenance of the existing wetlands and watersheds. Wetlands not only minimize flooding but act as natural water purification. Protect wetlands. The priority should be protecting the environment, without it the economy will eventually falter.
- My comments should reflect a value system that places people firmly within our own ecosystem and the economy as a subset of the environment. To me, the balance is how to live within a healthy ecosystem. Questions that ask how much water is surplus to a river make no sense to me. We should be using as little of it as possible. Thank you for the opportunity to comment.
- Get a handle on Provincial/Federal jurisdiction as it applies to the watershed. Integrate the above with C5 Federal endangered species legislation and Alberta endangered species legislation under the Wildlife Act. The Water Act does not recognize that there is a water cycle. There is only so much water on the planet and it continues to cycle except for water that is powered down oil wells to stimulate production. This amount of water taken out of the water cycle by Alberta's oil and gas is equivalent to the water used by Edmonton, Calgary and Red Deer each year. You have not focused on the management of water in the watershed by changes to agriculture management (e.g. more organic matter on the topsoil which absorbs and holds water). Water does not magically appear in rivers it comes from the surrounding watershed. You have missed a significant portion of the strategy. Think in a holistic manner, not like a linear government staff person.
- Maintaining the health of our aquatic ecosystem should be the main focus of any water strategy - without it we have nothing.
- For years no one really understood the volume of wetlands. Sloughs were drained. Potholes filled in. Today, we understand the importance of wetlands. From reducing the severity of floods to purifying surface water, we now realize the importance of wetlands. Had we realized the value, It doubt they would have been drained. Today the government should protect these remaining wetlands.
- It believe the government should always recognize watersheds and wetlands and their importance to a healthy environment in the processing of provincial water strategy.
- Save our wetlands! Stop flooding the grasslands! These areas essential to our future existence. Do what it takes to make it a priority.
- It is essential that the government recognize wetlands and their importance in any overall water strategy. All existing wetlands should be preserved and old ones restored. There should be laws or compensation to landowners to maintain wetlands and marginal lands. As a long time fisherman and hunter, the importance of water maintenance, conservation, etc. cannot be stressed too much. People have to be educated.
- It is essential that the government recognize wetlands and watersheds and their importance to a healthy environment.
- Wetlands and healthy watersheds contribute to groundwater recharge by soaking up surface water and letting some of it seep back into the ground where it's filtered even further. Wetland loss will mean decreased amounts of groundwater. The water strategy needs to address the importance of wetlands to groundwater. Wetlands reduce the severity of floods by retaining water and releasing it slowly. They protect shorelines from erosion by slowing the flow of water and lowering the crest of rivers and streams during spring and storm run-off peaks. The water strategy needs to recognize the value of wetlands for flood control. The provincial water strategy should not only address the preservation of the province's existing wetlands, but also provide the framework for the restoration of drained wetland habitat in order to rebuild healthy watersheds. Wetlands should be protected by legislation.

- It is important that the government recognize wetlands and watersheds and protect by legislation.
- Groundwater depends on wetlands. All wetlands need to be protected by legislation. Any loss of wetlands needs to be unequivocally replaced. Wetlands slow runoff and filter impurities while adding to groundwater. We Albertans have to plan for both environment and a sustainable economy. Each has to complement the other. We need to seek out, designate, recognize and preserve all wetlands both on public and private land for now and forever.
- Incentives to maintain aquatic environments should be introduced which would balance off the sacrifices needed to maintain such environments.
- Grants should be made available to watershed groups to assist in the funding of major projects. Watershed groups are comprised of mainly volunteers and should remain as such to ensure good results.
- It feel that environmental and ecosystem concerns are definitely important. It would like to know how many people realize that before our dams and reservoirs certain rivers, especially in the south, went completely dry in some of the driest seasons. It feel that if nature and its environments are to be considered we must also consider impacts such as this. Many rivers do not experience the natural ebb and flow. How are ecosystems that for thousands of years went dry every 40 to 50 years being affected by this not happening. Our dams and reservoirs already do a great deal to preserve aquatic life.
- Aquatic ecosystems are costly to determine and maintain, also not reliable. It is the writer's opinion that we in Alberta are 25 - 30 years behind in establishing and sustaining a reliable and dependable supply of water for Albertans. It could think of no better way to use the Heritage Trust Funds than to use it for water capture and storage for the future, but it must start soon or the allocations we speak of will become hard rationing of a life sustaining commodity. The "rainy day" has arrived for our future generations.
- What is the right balance? How do we know when the ecosystem [is in jeopardy]? We have to be careful when considering the "science" of impacts on ecosystems. There is a lot of conflicting science.
- It believe this may be the most important section in this survey. The watershed approach to managing is crucial to the entire system (people, industry, environment, agriculture).
- Without environmental protection, the natural balance of the land and animals will be gone. Therefore we move closer to the doom of our earth.
- Ecosystems have to adapt to lower and higher water levels naturally - it is not reasonable or normal to try to maintain at some arbitrary "normal" level. Nature is not static. it is important that water conservation is encouraged to make the best use possible of what we have before extraordinary intervention happens - dams, transfers etc. Flexibility is important in any system of regulation that is created. There are different problems and solutions for different areas.
- In our area, Alberta Environment straightened the Lesser Slave River, which has drained the large lowlands, and caused the river to drain faster. They also cut off fish spawning tributaries in the process.
- We can live without daily showers, we can live without oil and gas, we can all eat less meat, but we cannot live without clean drinking water and healthy aquatic systems that provide it. Maintaining healthy functioning aquatic systems is the cheapest way to ensure a sustainable water supply for Alberta.
- It feel it is very important for the government to protect wetlands for now and future generations. If wetlands are used to build for social benefits then those wetlands should be replaced one for one. Wetlands should be protected by legislation throughout Canada as they are vital to all of us having clean water to use, animals to hunt, watch and enjoy. Wetlands are important to every person whether they know it or not. We need to plan now to sustain the environment and the economy for future use. If we maintain our wetlands and watersheds properly now we will have clean, purified water in all our lakes, rivers and wetlands.
- We must stop all practices that involve the pollution of watershed (i.e. commercial and private spraying of poisons that drain into creeks and rivers, the filling-in of swamps, diversions and blocking of creek and natural water drainage, disallow watering and feeding animals on and/or near any water).
- Why are we flushing toilets with good potable water instead of grey water in towns and cities? There is only one eco-system (not systems). There are only four processes to the one ecosystem: energy flow, water cycle, mineral cycle, community dynamics. Use the term "water catchment" instead of watershed areas.
- Farmers in particular should not be allowed to drain sloughs, ponds, etc., as most of these smaller bodies of water have been established for more than 50 years.

- Legislation should protect wetlands.
- It truly scares me that two entire communities in Saskatchewan are without a source of groundwater and we are still carrying on as if we have unlimited supply. It strongly urge policies to be put into place to protect our water supply for the future. Even if it means paying for water, limiting economic growth, or new taxes. It think foresight is needed by all. It would also like to see encouragement for things like planting shelter belts and other natural forms of capturing/conserving water, rather than building of unnatural infrastructures (i.e. dams and diversions from basin to basin). Please!
- The quality of the aquatic systems is very important in Alberta. Many of our rivers and lakes have suffered for too long. Warnings about toxins exist for fish in every major river basin. Some lakes also share these warnings. Lakes that used to support fish are now dead and stagnant. Over the last few years water quantity has suffered. We must protect the quality of the water that we do have. Improving water quality will also make more water available for commercial and agricultural development.
- Value of local watershed groups and watershed based planning. We have a vast, existing, free (or cheap) resource of water management, storage, recharge, etc. in the form of existing wetlands. We simply need to enforce existing laws regarding off farm drainage and force restoration of illegal drainage. People need to know a watershed is not just the creek or river, it is the whole area in the watershed.
- "Where there is no vision, people will perish." There is a lack of vision in this province. It commend those who have put the facts and information on water together. However, these facts are useless without a major change in thinking. Irrigation is not sustainable, the benefits of irrigation, not only for farming, but for society as a whole, have been enormous. Yet, in the long run, irrigation based societies have been failures. Irrigated land is prone to sanitization and falling fertility. Hopefully, this water strategy will look at how all water for irrigation could be used more efficiently. Solar power, as long as we have rivers, someone will always propose damming them for power, both export and domestic. This government should be encouraging other means of producing power that are environmentally friendly, solar and wind. Incentives should be paid to these alternative producers of power to encourage this safe, clean energy.
- It think that water should be allocated to the most useful resources. Water should be restricted for cosmetic purposes (creating beautiful lawns in places which don't naturally sustain that growth). Technology and practices for the conservation of water should be implemented to conserve the valuable resource to be best used. Sustaining the aquatic life should be first, economics second. Tax incentives, costs may be a way to motivation for these technologies and practices.
- The long-term price of not protecting aquatic systems may likely exceed the costs of development activities. We have a history in Alberta of deferring "environmental" costs to future generations. This is not sound management. In the battle of development versus conservation, development typically wins in this province. It is far cheaper to sustain existing, healthy eco-systems than try to "fix" them later. Their "value" is already known, don't ignore them.
- Wetlands must be protected by legislation. The interests of business (including farms and ranchers draining every potable) should not take priority over the environment.
- Water should be our number one concern, not economic growth. If we did not pollute our water, water quality would not be a concern. There must be a zero tolerance for any substance entering a water system; industrial, agricultural or anything else for that matter. Without good water, there will be no social well being and no economic growth, etc. We must face the fact there is only so much room for industrial development and population growth in a set area. We cannot alter these limitations. It's been tried and has failed. Short-term gain for long-term problems.
- Maintaining functioning, intact ecosystems is key to having the ecosystem services provided such as water purification, reduced sedimentation and abundant water flow. We depend on these natural processes to survive. Less focus needs to be placed on healthy economies and more placed on healthy ecologies. The questions in "Safeguarding Alberta's Healthy ecosystems" underlines how poorly you understand the ecology and natural processes. You need to determine key uncertainties and risks associated with different levels of water use and basin damage using adaptive management approaches. Climate changes as a result primary of carbon dioxide and methane production from fossil fuel production is a key uncertainty to be addressed. All water management plans should adopt precautionary management principles to accommodate. Key uncertainties such as climate change. Accept that it will cost money to have clean water and healthy ecosystems.
- Economic development cannot take precedence over environmental concerns.

- A sustainable environment is necessary for a sustainable economy. The provincial water strategy should not only address the preservation of wetlands but also should restore drained wetland habitat in order to rebuild healthy watersheds. Wetlands should be protected by legislation.

did not indicate location

- Private landowners contributions to these strategies should be recognized. Legislated wetland protection needs consideration.
- It feel it is essential that the government consistently recognize wetlands and watersheds and their importance to a healthy environment throughout the development of the provincial water strategy. In some situations, the loss of wetlands is necessary for developments that have significant social benefits. In those cases, wetlands lost should be replaced. The wetland strategy should clearly champion no net loss for wetlands. Wetlands should be protected by legislature. Wetlands and healthy watersheds contributed to groundwater recharge by soaking up surface water and letting some of it seep back into the ground where it's filtered even further. Wetland loss will mean decreased amounts of groundwater. The water strategy needs to address the importance of wetlands to groundwater. Wetlands should be protected by legislation.
- Preserve the province's existing wetlands and provide the framework for restoration of drained wetland habitat in order to rebuild healthy watersheds. Wetlands should be protected by legislation!
- Watersheds and wetlands contained within them are essential to maintain our environment and the economy and human health that is completely dependent on our environment.
- It think we have an obligation to leave as much of the water resource as we can for its natural users - fish, animals and nature in general.
- The environment should be protected at all costs, and water used extremely wisely.
- Water is a provincial responsibility and resource held in the public interest.
- Water storage: maximize natural storage by protecting and recovering riparian zones, including wetlands, marshes, swamps, bogs, fens, etc.
- Water for life is the end result of not taking care of our ecosystem. We damage the soil, air and it eventually reaches the water to be contaminated. With proper disposable of our waste we can reduce health care costs, protect our water table and if we can give this industry to Aboriginal communities we can have them become self sufficient. Oil and gas companies are able to come to this province and extract the oil and what safeguards are given that they leave the property in the same condition that they found it? The Aboriginal people believe in the seven sacred arrows which means what we do today will affect seven generations. When the oil and gas is running out, who do you think is going to get the product? If we can set up an alternative energy source we would have a way to heat and light homes after the gas is gone. Alternative energy sources as wind and solar power are great but It think biomass power will help us take care of a problem that could and will damage our water table. Thank you, It enjoyed the seminar very much and clarified some points that It was not aware of.
- If you safeguard Alberta's ecosystem and enforce it, all other aspects will be taken care of.
- 1. When there is a need to lose wetlands for developments they must be replaced to maintain the balance. 2. Maintain wetlands and watersheds to positively affect quality of water. 3. Top priority must be the first three objectives in the water strategy.
- It is essential that the government consistently recognize wetlands and watersheds and their importance to a healthy environment throughout the development of the provincial water strategy. A sustainable environment is necessary for a sustainable economy. Albertans will have to plan carefully so both the environment and the economy can be maintained. In some situations, the loss of wetlands is necessary for developments that have significant social benefits. In those cases, wetlands lost should be replaced. The wetlands strategy should clearly champion no net loss for wetland. Wetlands should be protected by legislation. The provincial Water Strategy should not only address the preservation of the provinces existing wetlands, but also provide the framework for the restoration of drained wetland habitat in order to rebuild healthy watersheds. Wetlands should be protected by legislation. Water does not begin its journey just at the bank of a lake, stream, river or wetland; adjacent watersheds are a critical component as well. Maintenance of wetlands and watersheds can significantly affect water quality and quantity in lakes, rivers and aquifers. Wetlands act as nature's kidneys within watersheds. They help to purify surface water by breaking down, removing, using or trapping nutrients, agricultural herbicides and

pesticides, organic waste and sediment that are carried to them by run-off water. Wetlands should be protected by legislation. Wetlands reduce the severity of floods by retaining water and releasing it slowly. They protect shore lines from erosion by slowing the flow of water and lowering the crest of rivers and streams during spring and storm runoff peaks. The water strategy needs to recognize the value of wetlands for flood control. Wetlands provide natural food storage and should be protected by legislation. Wetlands and healthy watersheds contribute to groundwater recharge by soaking up surface water and letting some of it seep back into the ground where it is filtered even further. Wetland loss will mean decreased amounts of groundwater. The water strategy needs to address of wetland to groundwater. Wetlands should be protected by legislation.

- The first three objectives in water strategy should be in order of priority, if our environment is not maintained we will have a much poorer economy in the future. Since wetlands provide so many societal benefits, the water strategy should address the issue of recognizing private land owners for the provision of those benefits on their land. Similarly, those who alter the hydrological pattern should share in the responsibility for the resulting impacts.
- Watersheds are the key to all life on this planet. Without a healthy watershed and ecosystem, nothing will survive. We as Albertans, as Canadians, and as people of our planet, need to take a more open-minded approach to how we are damaging and abusing this precious resource. We have to realize that water and a healthy ecosystem have to come before anything else. Whether that be commercial, industrial, agricultural or personal use, we all have to realize that this resource will not be here in the future if we keep abusing it. It feel as the Government of Alberta, you should take greater steps to promote water and wetland conservation, because without it, Alberta won't have an economy. In fact, in the long run it won't have any people if there is no environment left to support them.
- Look after our environment and it in turn will look after us!
- Concentrations of substances will only compound themselves in an ecosystem and have a detrimental effect on future generations if not strictly monitored. Wind generation facilities need to be further developed in order to ensure there is water to be conserved. The possibility of developing hydro electric generation in storm sewers might be something to look at.
- Water management in theory sounds good, but poorly managed defeats the purpose. It live next to a couple of lakes that Ducks Unlimited has control structures on them. Poor management has damaged the nesting ground more than once (i.e. water level low). Bird nest then water level is raised putting nest under water or water level dropped and nest are to far from water making them easy for predators to get the nests. Also are the groups like Ducks Unlimited trying to preserve the duck or raise more for hunter south of the boarder.
- Alberta must examine closely its policies and aversion to environment agreements, such as the Kyoto agreement. If Alberta wants to maintain a sustainable water supply, then it must consider the impact of the energy industry on the environment, and realize that proposed agreements like Kyoto assist in the protection of the ecosystem and ultimately the water supply that is encompassed in it.
- This represents a compilation of what our group agrees with. We support protection and enhancement of water quality and quantity. Individuals take responsibility for best water management practices.

Sustainable growth, growth vs. protection, balance

north of Red Deer

- Private landowners recognized for wetlands on their land and also responsible for resulting imports if altered. Wetlands should be protected by legislation as they help purify surface water. An environmental plan installed so both environment and economy can be maintained.
- Ecosystem use and economic development do not have to be at odds with each other. Rather what is required is adequate regulations on the use, re-use or quality of return water.
- Economic growth should not expand at the expense of the environment. Each municipality should be prepared to purify the water that they discharge to a purity as great as they receive it. Drinking water (intake) should be downstream from the discharge so it is returned to the river in a pure state for the next municipality. Let Albertans be the leaders in the cleanest water to enhance the quality of life so others will follow. A concern – when a company (drilling) drills exploration holes in a lake (e.g. Brilliant Diamond

Co.) are there strict regulations in place so there is no leakage of water down the drilling hole? We must be very careful in using our groundwater, as it would be very easy to start abusing the usage of said water.

- At present we tend to assign growth the highest priority, then scramble to provide the water necessary to sustain it. A more effective, and sustainable strategy is to determine what type and level of development is sustainable in a geographic area (while ensuring aquatic ecosystem protection) and then proceeding with orderly, planned development. The various government departments believe they have a mandate to expand their level of economic strength; unfortunately, they are often competing for the same water resources. There needs to be an overall strategy that is open and transparent to the public.
- We have to start to practice sustainable development, not solely economic development as is currently reflected in our policies.
- Bottom line, province can only sustain so many people. Limiting factors are obviously 1. Water, 2. Resources, 3. Space. Trade off is between economic growth vs. environment. Environment must win or everyone will lose. Industry that uses water must pay for it – not tax payers. Individuals should user pay as well. This will force the best possible conservation.
- Wetlands should be protected by legislation. A sustainable environment is necessary for a sustainable economy. Albertans will have to plan carefully so both can be maintained. In some situations, the loss of wetlands is necessary for developments that have significant social benefits. In those cases, wetlands lost should be replaced. The wetland strategy should clearly champion no net loss for wetlands.
- Given the potential depletion of safe water, it is essential that we look at the possibility of limiting growth in some segments of our economy in order to protect our water supply.
- Water may prove to be the first true wake up call for our society that we cannot continue along our current path of prioritizing economic growth before all else, both societal and environmental. We must truly change our view of sustainability to meet this challenge.
- It strongly urge the government to draw upon the immense expertise of world renowned experts in the field of water management such as Dr. Schindler from the University of Alberta. It was with much concern that It read of the importance the government is placing on economic growth. Of course It realize that most of us benefit from economic growth in some way, but are we not forgetting that we have to live within the constraints that our environment places on us, rather than manipulate and model nature to simply satisfy our luxurious needs. We have to take responsibility for our resources and not by quick fix solutions, such as pipelines without fully facing the environmental consequences. It believe that we would be truly amazed at the difference we could make by using water wisely and strictly enforcing fines and standards on companies who pollute and show no respect for such a valuable commodity. How many Albertans know what Xeroxcaping is? It is all of our duty to live responsibly and respect our environment rather than only thinking of economic growth and elaborate wasteful industries like the oil sands.
- It is imperative that Alberta, like other places, begin to recognize that there truly are ecological limits to growth. We can have economic growth and a value-added economy if we start making more intelligent and strategic choices about the growth and development we encourage. This is not intensive livestock operations for example.
- I know that balancing economies and the environment is important but we must also think what it will cost us in the long run. The environment supports industries. Attacking it at its base (the water system-as it supplies all living things with life) will only serve to eventually destroy the industries and more importantly, our world. Currently, the economic valuation of the ecosystem and its constituents it well below what it should be. Please don't let the small monetary value sway most of your decisions to the industries' side. I have heard that not all homes and businesses have water meters. This is a must if for nothing else but to know exactly how much water is being used. Growth has to be redirected or stopped in certain parts of Alberta to sustain our environment depending on water quantity.
- I've never seen a province with so much economic growth and money become so cheap and greedy. We are a country. Why does every decision come down to money? How about what is best for the ecosystem? How is it Saskatchewan can have no growth (just a decline) in economy for the last 100 years and still balance a budget? Alberta has more money than half the provinces combined and they insist on getting more. Maybe it is time the greedy, polluting industry stopped running the province and we got to say enough is enough. How about letting the earth heal from all the raping you did, but I guess then the rich couldn't get richer.

- Safe water for the future is more important than economic growth.
- Allocation must stop well short of the point of significant impacts on the aquatic environment. The Alberta government must take a stronger enforcement stance with violators of the Water Act. The current performance in that area has been extremely poor, and in the long run this will only hurt all Albertans. The challenge is live within our means, and this will means some new thinking about water, so we don't wind up drying up more rivers and over allocating because we don't resolve to say no. Some of your questions were somewhat difficult to know how to respond to. I could have answered disagree because the option didn't go far enough, even though I supported it.
- If we are going to give equal weight to economic growth and ecological sustainability, we may as well give up now. The integrity of the ecological systems within the province must be the overriding objective or there will be serious consequences down the road.
- Our environment should be our first priority because without a strong and healthy environment, how can we sustain a healthy economy. We need to sustain a balance between the two.
- Water quantity and quality to maintain healthy aquatic environments should take precedence over water use for economic growth. To maintain the above, industry that relies on a large amount of water WILL reach a maximum growth point at some time in this province. There is the wall past which these industries cannot grow. Industries and commercial projects which do not require large amounts of water should be the type of growth the government is encouraging and promoting at present, to ensure future continued economic growth and well being without risking this Province's environment when high use industry does hit the water wall. Oil and gas growth will decline and die at some point in the future, and the government should be preparing now for a sustainable economy then.
- In the past number of years this province has allowed deforestation to the point that it is affecting water levels in many lakes and rivers to be at critical levels. They say that these levels were attained fifty to a hundred years ago; this was so but for different reasons. Forest fires were to blame in the past. But the water usage was never so high. Therefore what man is doing for economic gain is having the same effect. Our government has to rethink its strategy. It gets to a point that there is only so much out there. Our latitude on this planet does not give us the weather patterns of the Tropics, if we disrupt the weather by removing the moisture- creating and retaining structure, we're in deep shit. Think again, without the trees we have no hope and trying to mask their loss for economic gain is not going to help us down the road.
- Thank you for the opportunity to comment. We must realize that the continued economic growth model, and considering we have finite natural resources to utilize on an indefinite basis, is no longer realistic or recommended. The assumption that technology can solve this balance requirement is debatable. Consider looking at other models in the world that take on a more holistic approach. I do not support the transfer of any water unless it's for compassionate grounds and the problem to their water issues have been resolved, not just addressed by band-aid approaches (i.e. transfer new water sources).
- Need to balance economic growth with a sustainable environment. Too much demand on the environment over the long-term will require a higher price than the costs involved in limiting economic development to a long-term sustainable level.

Red Deer and south

- To sustain an economy in the long-run, it cannot adversely affect the environment. If it does affect the environment negatively, then in time the environment will deteriorate beyond repair. Limiting water supplies encourages research and money to be put in place to find more efficient ways to operate.
- To continue to encourage development in the southern part of the province were water is at a premium and used on marginally valued crops when the true cost of water is taken into account cannot continue. People cannot locate themselves in a semi-arid desert environment and then expect the taxpayers of Alberta to finance grand water schemes so they can have access to water. Everyone needs to at the very least read the "Cadillac Desert" to get an idea as to how political this resource becomes and the gross misuse of public funds used to put water were people should not even be living. The water issues at the time of writing in 1986 are still every bit as applicable today.
- Should research European and other countries to see what level of management protects the environment the most efficiently while still allowing for moderate economic growth. We all have to cut back use and abuse. Canadians should know they are close to the worst abusers of water in the world.

People do not understand that source groundwater needs to be recharged in specific areas. What you do with your crops matters.

- Economic growth is not important. What is important is to sustain our environment and current water users.
- There are two things that concern me. First is that industrial or commercial use of water may occur at the expense of the environment or the needs of the domestic user. The second is that the government may spend a fortune trying to sort all this out. I think a lot of the answers are already out there, and there is no need to spend heavily looking for them.
- Water is without question vital to all life. It must be protected at all costs otherwise there will not be any economic growth.
- My hope is that Alberta can stimulate future economic growth in the right sectors, which means minimal impact on the environment and growth at a reasonable, sustainable rate.
- Our creeks, rivers, streams, wetlands and all other water bodies above or below ground are our water investment. Taking a proactive approach and minimizing pollution from entering these systems are the beginning of long-term and effective solutions. Diverting water is a band-aid solution which could have detrimental effects on the environment. Introduction of species from one area to another can and often is damaging. Water begets water. Maintaining water in its "natural" environment is vital to the hydrology cycle, aquatic environment and to water quality/quantity. These are areas that need to be protected so that future use for everyone is attainable. Economic growth is not a luxury that is shared by all Canadians. Economic growth alone, is only a short-term benefit for a relatively small portion of our population, finding the balance that sustains both economic and environmental growth provides long-term benefits for a greater part of the population, finding the balance that sustains both economic and environmental growth provides long-term benefits for a greater part of population (both health and money benefits). Finally, water quality is everyone's responsibility not just industry or agriculture or government or cities but every individuals'. We need to create awareness programs about water conservation and use. We need to prevent the pollution of the water in the first place so that we do not have to worry so much about the costs of treating it.
- A sustainable environment is necessary for a sustainable economy. Albertans will have to plan carefully so both environment and economy can be maintained. It is essential that the government consistently recognize wetlands and watersheds and their importance to a health environment throughout the development of a provincial water strategy. The first three objectives in the water strategy should be in order of priority, if our environment is not maintained we will have a much poorer economy in the future.
- Growth management needs to be balanced with the health of the resource and may mean limits to growth. Alberta Advantage very difficult to impossible to safeguard Alberta's ecosystems with Alberta Advantage – priority for our province. Needs to be a greater connection between values – connecting to human health, social values, cultural and economic.
- If we destroy our own habitat (includes aquatic ecosystem) what is the point of economic growth. Greed blurs the meaning of 'sustainable." The government will have to make difficult decisions to protect water uses, which will include saying no to rampant growth – which it allows now. We need to decline an end point when sustainability becomes unsustainable we have already exceeded them in some cases.
- Our water is one of those precious premiums that comes from the decision to live in this part of Canada (North America). Where there are so many other climatic/geo-economic penalties, access to fresh and plentiful water has been one of the perks. We must protect our supplies for home use, and take care not to overload the system by encouraging insane economic and demographic growth.
- I am pleased to have an opportunity to impact decisions that will so strongly affect our future. I hope that the provincial government will not sacrifice long-term environmental stability for short-term economic gain.
- Alberta must decide if it wants economic growth or economic sustainability; they are not the same thing. Sustainable economic growth is possible, but the other side of sustainability is to know when growth is not sustainable. Sustainability in terms of our aquatic environment means that some areas of the province may not develop because of a lack of water resources. If the environment cannot support this economic growth without importing or diverting water, it is not sustainable and should not happen. Water is a scarce resource that is essential to all life. I hope the government will look beyond economic growth in the short-term and consider the long-term health and well being of all life in Alberta.

- Sustainable ecosystems equals sustainable economy (potentially). Therefore, ecosystem health must take precedence over economic gains. Maximum levels of water and contaminant levels must be accounted for. The regulations concerning pollutant levels are too lenient and very dated. These must be changed to achieve a healthy ecosystem.
- We would not have to spend huge amounts of money on flood prevention or flood recovery if we prohibited developments on flood plains. I do not believe that society should pay the costs for people or businesses that adopt risky behaviour. It is short-sighted to imagine that we have to balance ecosystem health with sustainable economy and societal good. In the long-term, societal good and sustainable economy utterly depend upon ecosystem health. If we damage our resource base we damage our economy and our society!
- We may need to limit population growth in certain river basins to the amount of water that basin can comfortably supply. Water entering a river or stream must be as good or better quality than the stream it is entering. We must protect riparian areas and wetlands. We can use wetlands as water storage and purification systems. Domestic and irrigation should be priority in water allocation, but we must not expand irrigation over the capacity of a watershed.
- Our present government seems to think you can keep increasing development in agriculture or heavy industry with no regard to sustainability over time. Quick gain, low pain, here today, gone tomorrow. Irrigation and urban meters should be mandatory or any rural usage off surface water systems. Groundwater use for large confined livestock operations over 1,000 head of livestock. We need more trees and less care of lawns in both urban and rural areas.

did not indicate location

- Thank you for letting me provide feedback. As you note I believe water is very important and should be protected. Sustainability as infinitum is most important so any definition of "how much water is needed to keep the aquatic environment healthy?" should be provided with a margin of error until we know more. Good luck!

Transfers, diversions, storage

north of Red Deer

- Don't build any more dams.
- No inter-basin water transfers. Encourage water based development to occur where the water is. Begin investing in northern Alberta rather than siphoning resources to the south.
- Most issues were dealt with in the recent Water Act. I believe this new strategy is to promote inter-basin water transfer (dams). I do not support this initiative. Most of the northern rivers are near 100% or allocated groundwater use. The cost and damage to the ecosystems will not be sustainable. I see the biggest threat is the resource (oil) industry pumping massive amounts of water into the ground therefore lost forever. Water is possibly worth more than the oil. Another issue is that which involves intensive farming of livestock and its contamination of groundwater sources. If we don't have clean quantity and quality of water and air, life will cease to exist.
- I strongly oppose the use of water for irrigation in southern Alberta or the building of dams to support the practice.
- Multi-millions and millions of gallons of fresh water go wasted into the Beaufort Sea (Arctic Ocean) every year. Could this completely wasted water be somehow diverted to be used in Alberta?
- No river diversion, no water floods.
- Mere humans cannot reroute and hugely alter our landscape counteracting millions of years of natural effects. This would be the height of stupidity. All for a few cow and pig farmers from southern Alberta. It's time we, as in our government; started thinking before we act. I do not recall any issue that has meant more to me than this one.
- Man made lakes. In my area the ponds, lakes, creeks and rivers are being over used. I spend days on all of the above. People you meet are from different areas – mostly cities like Edmonton, Grande Prairie, Peace River. They all have the same story. No place to fish. There needs to be more water areas made.

So these people can enjoy outdoor activities and take the pressure off the lakes, rivers, we have in our own back yards.

- Inter-basin transfers are a no-no.
- Diversion of raw water from provincial sources should only be allowed with a payment to the Province, to allow more effective management of the resource. Construction of infrastructure by the Province for the use of a small number of users is a poor investment. Some payment for this benefit is required to ensure that the use is economically justified. No diversion should be allowed until the aquatic needs are established and met.
- Inter-basin transfer of water by any means - dams, canals, pipelines is too costly.

Red Deer and south

- Get started on securing water in the watersheds of the mountains before it's needed. Divert northern water south before it is a crisis. Let's be pro-active in this rather than reactive. Come on Albertans "let's roll."
- Water diversion between basins and rivers is very dangerous and should not even be contemplated. Note: Lorne Taylor should consider moving cattle to Great Slave Lake - rather than moving the water to the cattle. Irrigation is important. Food (and water) is crucial to life but efficiencies must be looked at with a view to say a 10% reduction in use.
- It would hesitate to encourage development in areas where water is limited. Development would increase to a new level and disasters would be more severe. Basin transfers would encourage new development up to a new threshold and then what? Off-stream water storage - reservoir storage in streams - increases flexibility and buffers some shortages during drought. Encourage conservation with (irrigation - home owners). Reuse of grey water for non-consumption use.
- Off stream storage will prevent electric power generation. Storage of 3 million acre feet of water at the Meridian Dam is very efficient when the true economic numbers are applied.
- More dams to store water for low water flow times.
- The building of dams/reservoirs must be pursued – to capture spring run-off and floods. Inter-basin transfers must be considered: the water is in the north; the people are in the south. It is already in the agreement in the Milk River scenario. We need to have the dam and they was completed in 1980. In the case of aquifers – flowing wells should not be allowed unchecked (water waste and possible contamination). More efficient irrigation practices (loss of water in open canals. Also, efficient use of irrigation water).
- It appears that the amount of water available in the south is limited. Either, we move industry and people north or we bring water south by inter-basin transfers. The winters are too long and the days too short to live in the north. Send the water south.

did not indicate location

- Transfers will not solve problem as every drop will be used in future and jealously guarded. Please remember the sheep/cattle wars.
- Water should not be separated from land - transfers create deserts. Some things should not be a commodity on the open market.
- It am opposed to water transfers.
- It is silly to consider inter-basin transfers when (in southern Alberta) you can drive around in mid-day, in the middle of summer and see farmers watering using the large circular sprinklers–look to low use technologies such as drip irrigation.
- The use of water diversion and infrastructure to address water shortages in the grassland and parkland natural regions of Alberta is not an appropriate water management strategy. There are many predictions that Alberta will start diverting water from northern or western areas of the province to the southern areas of the province, as well as potentially exporting water into the U.S.. It highly disagree with this use of water, and fear what kind of message this would give to our future generations! Alberta's economy is largely resource-based, and we have a tendency to extract resources with poor regard for long-term sustainability and ecological integrity in mind. I do not want to see yet another "resource" mismanaged in the same way. There are four primary reasons why I feel the use of infrastructure is not an effective

component of the water strategy: 1) The ecological consequences of these types of activities greatly outweigh the benefits. 2) These would be highly costly to establish and maintain. 3) Relatively low economic benefits would occur if watercourse alterations were to be used to support agricultural practices in areas that are otherwise too arid. 4)Watercourse alterations would support a relatively small proportion of Albertans (Oldman Dam is a case in point, and the proposed Meridian Dam). Thank you for this opportunity.

- Diverting water will not solve issues in the long run. Conservation and "best practices" is the key. A holistic approach is best. Charge agriculture to dry land practices and products.

Recreation

north of Red Deer

- Recreational use is already taking a toll. Quad use in stream beds are getting to be a huge concern.

Red Deer and south

- I would like the government to ban all motorized water craft from the Red Deer River. These boats can cause river bank erosion, destruction of spawning beds and noise pollution.
- Please consider water sports such as canoeing. Canoeing is a big industry in Alberta too. Many young people enjoy canoeing - it is a healthy sport. Spring flood is a prime time for canoeing - do not stop spring floods by storing water.

Government bashing, Water Act, other legislation

north of Red Deer

- Must coordinate all activities with the Federal Government as per Fisheries and Oceans. As they have moved into province and may support different rivers than province and/or citizens.
- I do not trust the present provincial government to safeguard the interests of private Albertans (especially those not in Calgary) in opposed to those of big business.
- The Province of Alberta is not more aggressive in charging and penalizing those who misuse and abuse (pollute) water supplies.
- Our current Minister of Environment puts the interests of a special few of his constituents before the interests of all Albertans. This was recently shown by his very public stance on helping the business interests of a few southern Alberta irrigation farmers and ranchers with water diversion projects despite the overwhelming harm this would cause the environment (e.g. Meridian Dam).
- The Government of Alberta pursues and promotes a policy of irrigation farming and intensive livestock operations in southern Alberta which has a historical lack of water (semi-arid climate).
- Our current Minister of Environment puts the concerns of business and economic development ahead of environmental issues.
- This whole process is a sham. We know that steps are already in place to disenfranchise Albertans at the cost of big business – specifically the petroleum industry. If the government had any guts it would be clamping down on the cheap means used by this industry and forcing them to use alternative technologies in all areas of their industry. If you want to drive agriculture out of the province, as apparently you do, continue on this path and the price of food will skyrocket.

Red Deer and south

- This workbook reveals the antiquated, polarized and myopic mind set of this government and the Minister of Environment! It is time you leave this outdated, industrial, materialistic and mechanistic view of the world behind and open your minds to a realm of enlightened governance that sees the human endeavour in a broader context beyond the social, political and economic. Open your eyes to the world where ecology is the centre from which all else grows and the foundation upon which all depends. The social, political and economic can only sustain themselves if grounded in a healthy environment as designed by nature and not by engineers seeking to rework this long-ago perfected matrix of life. In short, get your priorities in order and this means starting with the preservation and maintenance of ecological integrity, not your selfish and short-sighted greed for more power and more money. You live in another world from us and I hope you pull your head out of the clouds before you destroy this province completely. To compromise the environmental health, richness and diversity of this province is to destroy that which we depend on for basic life and health as biological organisms. We are as dependent on nature and healthy, fully-functioning ecosystems as the smallest single-celled organism. To live and to be human to our full spiritual and intellectual potential is to be intelligent and wise enough to live within the means of our environment. There is no higher challenge or calling than to apply our human power and ingenuity to finding ways to live in harmony with that which sustains us. Your political games and associated abuse of power and democracy is unprecedented in this province and it will be your undoing. I just hope you "undo" yourself before you destroy the things that make life worth living in Alberta. This water strategy is a critical place for you to start down a new path and to reacquaint yourself with the things that matter to Albertans and the rest of humanity. I was at a few of the public meetings and on the basis of this, I know that I can say this with complete confidence. For our sake and the sake of future Albertans, please revisit your priorities and seek grounding in a world view that starts at the centre of all life, our environment.

- I am glad I took this booklet home for further study. I hope it is received in time to be considered. I hope the government is in fact listening. Other such studies in education and medicare have fallen on deaf ears. What is the cost of this study? If good comes of it, it doesn't matter. If it gathers dust and the government allows the water system to continue to be abused and nothing is done???? Perhaps I am too cynical, but I fear a "Walkerton" on a huge scale. I fear for my kids and grandchildren. Our government has "screwed up" so much and so often by sitting in the pocket of big business and by sitting on the poor and the old that I fear the worst. Imagine taking the teeth out of the mouths of the old, class credits from the youth in school and the financial help from the physically handicapped, while allowing taxes on oil companies and other big business to be cut. Shame, Shame, Shame.
- As a culture, we know very little about saving resources of any kind. Politicians promise prudence prior to their election and soon lose their responsibilities they were elected for (i.e. lottery funding for communities and charity). However, I do commend this endeavour to gather citizens' input into our water problems. Thank goodness you did it this way rather than giving the responsibility to Don Mazinkowski.
- It is crucial that the provincial government allocates adequate funding and resources to the implementation of a water strategy plan, otherwise it will remain a paper exercise. The recent round of cuts to Alberta Environment is therefore not promising. The costs to develop the necessary knowledge database and watershed plans et al is high and will take time-we may also face a shortage of qualified professionals when the baby boomers start to retire. Our current analyses are insufficient to assess the conditions around the major urban centres and they are too coarse to assess the short duration impacts associated with urban runoff on depleted river and creek systems.
- I am very concerned that political interests (i.e. short tem popular notions that are based on public or industry options) have and will continue to over-rule long-term water resource management objectives. Alberta Environment must find a way to stay the course - keep with scientifically based objectives and minimize the interference by its political leaders (i.e. the Minister of Environment). The Minister of Environment must learn to trust the expertise within AENV, let them do their job without being subject to periodic swings in policy every time a new Minister is appointed.
- No provincial strategy will work for surface water unless the Fisheries Act is followed. Therefore it should be a significant factor in developing any strategy. It is not even mentioned in this document. That is short sighted. I will consider suing the Province if it continues to breach the Fisheries Act.
- Legislation does not provide a balance.
- The federal government has a huge role through such legislation as the Canada Water Act, Canadian Environmental Protection Act, etc. You do not mention what role they would play in "safeguarding ecosystems." It would be nice to see all levels of government working together.
- I feel this exercise will be a waste of my time. I am cynical because I have done this type of thing for 20 years and this Tory government has always done what it wants anyway. The questions were skewed to produce the answers they want. There is no interest in this government of learning to live within natures means. Disrespect I'd guess you'd call it. Also, the head of AIPA Keith Francis is very high up in the

Mormon church and his sole goal is to divert water from northern Alberta to the US. Also, Lorne Taylor and every other Environment Minister has acted more like an agriculture minister or minister of economic development. Tell Klein to put in someone who actually wants to defend aquatic ecosystems.

- Most of the information the Alberta Government has regarding groundwater is a result of industry drilling/sampling/testing/modeling. The Alberta Government has to make an effort to figure some of this stuff out. The Alberta Government is also relying on industry and stakeholder groups to figure a lot of this out. The stakeholder groups are volunteers - working for free, and many do not have the required technical background. The Alberta Government needs to come to the table with professionals and money to help figure out a lot of these issues.
- We must change the approach which causes the taxpayer whenever economic growth is considered. The distance between the low income taxpayer and corporations is growing. Managers, CEO, MLAs are paid too much and do nothing for the rate payers. Doctors and policemen should make the big money, politicians and lawyers and business men should get paid what they do, nothing for society. The ability to hold rights to water and to charge for others to use it will be the downfall of small farmers and small business in Alberta. These entities are what makes Alberta a great province at present but that is quickly being lost.
- The idea mentioned in the questionnaire that water be allocated to the most beneficial use does not separate economical benefit from ecological and this is very underhanded and misleading. This survey is digging for answers to help justify the present course of our government's "water management" strategy. Little can be done to stave the "progress" pushed on the public by the fascists in power. More needs to be said about the underhanded dealings in the government and the lack of concern for our natural resources.
- The outstanding water situation of the First Nation people along Alberta rivers must be settled before any water management plan can even be considered. You have to know how much water will be available to you to manage before a plan is set in place. Let's be fair and not allocate all the water to non-natives until this issue is settled. "Canadian Law recognizes a treaty right to water for traditional and contemporary uses by the Indian." page 243. Once upon an Oldman.

did not indicate location

- The politicians have no right to prostitute our water to the greedy farmers, ranchers, and industrial users!

General, multi-themed comments

north of Red Deer

- Water equals life. Water has become the most important resource in the world. Wise, careful decisions WITHOUT pressure from the hugely influential, rich industries, need to be made to ensure quality of life for our children and their children.
- Aquatic and terrestrial animals/organisms must suffer for our sins. The sad part is that we know and understand the implications of our choices and this is unforgivable. All of the wildlife has no voice to say what they need so we must do our best to put them first. Without our lakes, rivers and wetlands the quality of our lands would dramatically decrease. The more water industry is allowed to use without thought to how much is lost (i.e. deep well injected after use in the oil and gas industry) the more they will take. Once this water is taken out of the hydrological cycle there becomes less and less water in the cycle, thus there is less available to all people. Education and the finding of alternate means must be of high priority in order to effectively manage our available water. The long-term gain must not be sacrificed for short-term economical gain. I am a student in my last year of the Environmental Monitoring and Compliance program at Lakeland College in Vermilion and I am going on to a degree. I am very interested in being involved in the Minister's Forum.
- We should not set up any system for water pricing that leads to increasing our requirement to sell water internationally through the NAFTA agreement. We must implement systems to protect watershed source management.
- I am deeply troubled by some of the statements in this workbook because they suggest to me that economic interests have had the last say on the design of this, overriding ecological reality. Provincial

government policies, and common sense itself. I am appalled that there is ANY mention of inter-basin transfer (especially with the word "may" used instead of "will" be ecological consequences), which has been acknowledged by the Premier as an environmental disaster, and something that will NOT be done. The only reason I can see for mention of it here is that people who profit from dams must have had the last word. It makes no sense at all that anyone else would include this. I am troubled too that dams would be represented as the only infrastructure in water management. Crumbling municipal water infrastructure is a huge issue across the province, country and world, yet no mention is made of this. Again, I see this as a promotion of the dam-building industry, and an avoidance of a difficult political issue - who will fix our ailing pipes? I am troubled by the evidence in this workbook of the common economic mistake of believing that economies and ecology are somehow separate. We are biological beings, we need water to live, and to ignore, or at worst sacrifice our environment for dollars is poor economic planning indeed. A saying that is apt that goes something like, 'only when they have drained every river, cut down every tree, and caught every fish will they realize they can't eat money'. Sacrificing environment today just means greater costs to try to restore it tomorrow, if it's possible to do at all. Costs to protect water from contamination are ALWAYS more cost-effective than trying to clean up contaminated water afterwards. I am troubled too that a HUGE issue for Albertans is not given prominence: the vast quantity of water that is used by the gas and oil industry in deep-well injection. This water is often potable water, and often groundwater. Injection means this water is lost forever, unlike most of our uses of water. This is such an unwise and completely unsustainable use of water, I think it should not only be prohibited, but perhaps criminalized. The government has set targets for increases in intensive livestock operations in Alberta, despite the disapproval of Albertans and the inherent risk it poses to our water. I am disappointed that this workbook did not dedicate a section just to this issue. The ILO industry is not a sustainable one, and the risk to water alone should prevent the government from promoting an expansion. Deforestation is an important issue in water management and particularly in flood control, yet it is not given a section here. Perhaps it is glossed over as one of those "economic activities" that must be "balanced" with aquatic ecosystem health. An issue of GLOBAL significance is the issue of privatization of water and bulk water transfers. If you were to poll Canadians, I would predict everyone would know of this issue and be concerned. Yet this issue is basically untouched by this workbook. Privatization of water is antithetical to water conservation: the more they sell, the more profit they get. It is also a huge humanitarian issue as well, since there are places in the world where people spend 30% or more of their income just for water. This is the global crisis that will likely result in wars in our lifetime. Surely a 50-year plan should be getting ready for this? The lack of this critical issue in this workbook makes me fear that, like the "road show" that pretended to want public input for the intensive livestock industry legislation while having made its mind up already (as per conversation overheard between Chair and panel member), that this is an exercise in public relations rather than a real request for input.

- Question 6 is probably the most important question. It ties all other questions or points together. Choice - the ability to choose - some have said it is our greatest gift - others said our greatest curse. We are now seeing the results of choosing to see ourselves as something other than part of the ecosystem - superior - the environment has/was/is something to be conquered and now - we are seeing the fruits of our labour. In order for this to work there has to be a fundamental shift in how we see ourselves and how we are one integral part - not apart of the environment. This fundamental shift will, I feel, come down to one more sacrifice. We are going to have to be prepared to make sacrifices - sacrifices we have never imagined - how we live, how we produce food - how many kids to have - how much to pay and to sacrifice this man made thing called economics - something that has existed for only 2 hundred years for something that has existed for millions of years - and is now seriously threatened. Now is the time before it is too late.
- Please ensure that our Alberta Water Strategy will promise that the long-term environmental well being of our water is more important than our greedy short-term selfish human economic gain. Note: tell Lorne Taylor to stand on Ralph Klein's and Pat Nelson's desks and talk loud and clear "the short-term economic gains are less than 10% of the 100% of the long-term economic costs to use and clean up water."
- We cannot continue to grow without the quality environment we need to live in. True prosperity is our quality of life. Let's not destroy our land at the expense of economic growth.
- At the meeting, several comments were directed toward reforestation. I agree. Indiscriminate land-clearing by farmers and logging companies directly impacts the rate of transpiration. This translates into

precipitation. On Highway 16, I have often seen a snow storm or rain shower occur on the highway just within the east and west boundaries of Elk Island Park. This seems to graphically illustrate the value of trees.

- Some of my fondest memories of life on the prairies are tied to ponds and sloughs (i.e. hockey, rafting, hunting, trapping, swimming). I am totally amazed how many farmers are willing to risk their grandchildren's well being for the sale of another 10 acres of land. Is it greed or lack of knowledge and foresight? Also please . . . . let's plant trees instead of brushing every bush on the horizon. Our children are counting on us!
- Plans have to be based on long-term goals. Areas that require water should be reconsidered for less water demanding crops or industry. Biological thresholds for water quality will never be exact. A large margin should be in place to protect aquatic ecosystems. Groundwater is not infinite. Local and regional groundwater systems have not been identified in many cases where demand is high i.e. all the "SAGD" along the east half of our province.
- Research and develop alternative industrial and agricultural practices that lower water use. More field level personnel are required for both research and monitoring. Voluntary compliance and self – monitoring are failures, and make it difficult to implement government policy. Stop the draining of bogs/fens/muskeg to protect water tables and the natural cleansing of water. Stop the disgusting waste of eastern slope water sources being used as cattle pasture (e.g. Highwood, South Kananaskis). Pay ranchers for hay with increased licences to 'out of province' hunters. No inter-basin transfer of water. Take climate change more seriously. Since glaciers are a major source of water in Alberta, they need extra protection. No building in flood plains. Make seismic and drilling companies accountable to area users of groundwater. Do the work to understand and log groundwater before industry drilling.
- 1. The Alberta government and municipal governments do not give protection of ecosystems the priority it deserves. Wetlands, riparian areas and watersheds in general need to be protected pro-actively. Set high protection standards, monitor actively and enforce. At present, landowners are allowed pretty much free rein to clear creeks, creek-sides and run cattle, etc., right into creeks and ponds-even rivers. When bad practices are reported, officials hide behind "we can't infringe on private property rights." Hogwash! Your job is to protect our environment, water, etc. Do it! 2. NO WATER TRANSFER or EXPORT!!!!
- Protection of all wetlands and watersheds must be legislated to ensure future needs. All Albertans must plan ahead so that both the environment and our economy can be maintained.
- I see this as a money grab for the government to collect more form private individuals. I agree there could be some problems, but agriculture is not one nor is the private landowner. People in town waste more because they think it's unlimited. People in rural areas never know when their water supply is going to be gone so they conserve and watch what is used. Trying to hit rural users is crazy. They pay to get dugouts and wells and cisterns put in why should they pay for water use. The government has their hands in people's lives way too much.
- Cleaning water after use and before it is released back into the environment must be a bigger priority.
- Alberta Health to be involved re: heavy metals in potable water (i.e. arsenic, lead, antimony). Mitigation of heavy trace metals in aquifers due to industry operations. Industry has to be more accountable instead of deny, diffuse, deflect strategies.
- Not all aquatic environments are unique nor significant, therefore some trade offs will be required for population growth and economic sustainability. Future policies must reflect this balance.
- Industries should be shut down and to consume their products if the natural resource aren't a purity to natural goodness, the business license should be revoked.
- What about international consumption? How much of our water will be supplemented to them and where?
- Why can't the government leave the fresh water where it is and do something about the salt water (ocean) 92% of what the world and create a fresh water plant for all the reservoirs required for supplement to the world!
- When will you tell the people about a shortage of water? I think water will become a drought with scarce.
- These shouldn't be considered as individual options.
- All government thinks of is economic growth. What about us that are here now? Let's deal with today. All groups must think about is what we have now as the water table is disappearing and when it is gone so are we, and we will not have to worry about the movement of water. If a user has water left over then he

should be rebated and the water turned back into the system for mother nature to have. They give it to someone else you can bet it will be used to the last drop. We all have a limited right to the use of water therefore water has to be protected from the abusers. Abusers should pay big time. This is an endangered substance not something that is made everyday in this country. You live in a dry area, expect to have limited amount of water. Water violations should be like theft charges, but stronger. Other countries feel this way – maybe we should.

- Water is a very important part of life, both human and other. It worries me that a government like ours is considering total protection from its population. Education is an important part of this problem. We must start early in life to realize the importance over time. It is a resource but should not be regulated to death by the government.
- Our responses represent the opinions of three adults living in the same household. We would like to see: heavier fines on industry from dumping effluent containing harmful chemicals. Currently there is a small penalty. It is more economical to be caught a few times and pay the fines than clean up their effluent. Randomized and frequent monitoring of industries water use. Regulations regarding acceptable effluent quality being kept up-to-date with current research. Greater respect for our water resources by our government, by upholding high standards and not sacrificing water quality for economic reasons (i.e. industrial activity and profits). Obtaining this survey was difficult (we are disappointed in this). We found some of the questions biased and confusing. Sacrificing the environment, in anyway, may make the environment uninhabitable for human life, let alone industrial or agricultural activity.
- Some areas of Alberta are unsuitable for growing agricultural produce. Farmers/individuals should not expect government to foot the bill for a good water supply because of the expense involved. Need to consider long-term implications of this.
- Industrial and agricultural uses must at all times be secondary to environmental concerns and habitat and recreational uses. Alberta is for Albertans – not corporations!
- Water charge rates if linear now should consider changing to tiered system where "excessive" water consumption is penalized. Similar to income tax structure (i.e. up to x amount = $y per m3, from x to 1.5x = 2x$y per m3, from 1.5x to 2x = 3x$y per m3) you get the idea.
- I believe that a review of the drainage license process is necessary. Too many wetlands have been drained thus a loss of water for evaporation and no water for recharge of groundwater aquifers. The township that I live in has only three natural bodies of water left.
- Create level playing field in province. All infrastructure dollars are currently spent in southern Alberta (i.e. dams, irrigation districts) and few in northern Alberta. Disappointed in direction of workbook. "Appears" to push people toward defined results.
- The farmers that farm in areas that are known to have limited amounts of water supply should be bought out or produce crops that need very little water to grow. We have a dam on the Peace River that is already damaging a World Heritage site – Peace-Athabasca Delta – so we don't need the tap shut on the Athabasca or Peace River. We depend on these waterways.
- When we think water management, we should think more education and conservation and less about damming and/or diversion. More cost effective and sustainable to be effective users of the resource (if we find expensive ways around the problem, there will never be incentive to conserve).
- There really has not been enough attention to the costs of the projects suggested in the workbook. The Meridian Dam report shows how uneconomic most large water management projects are. The province needs to do more to reduce flood damages by actively identifying and restricting development in flood plains. Municipalities allow these developments 'knowing' the politicians will step in to compensate for losses. This applies to new developments mostly but we need to see old developments addressed as well. Dyking helps but must not be the solution. Alberta needs to spend a lot more money gathering data on (it) groundwater supply and quality (ii) surface water quality (iii) water available for allocation that will not damage the aquatic environment. There is too much 'buck passing' on pollution issues especially as related to agricultural sources such as feedlots. One department must be able to address. Right now Agriculture and Environment point the finger at each other and nothing is really done.
- This survey is based on narrow minded thinking. The water resource is not a resource that can be accurately predicted and allocated into the future. We cannot know the events that will increase or decrease quantity and quality of water or watersheds in Alberta, or the level of impact(s) on the resource or the demand for it. Global climate change, ecological succession, population changes, consumer

demands, etc., are all only vague estimates in arriving at what the "water" requirement will be for Alberta in the future. The use of the resource is not a "do/don't-do" decision. Industry, residential and governmental practices can and will change to meet changing demands and constraints. The need for adaptive management has not even been inferred here. The needs and the reality of supply will change and the model for water management in Alberta must be able to change also. All water users must be accountable - that includes Alberta Water resources. Water should not be set up as a base commodity to Albertans. Incentives for wise use and conservation are a good idea. Penalties and high fines for contravention is a must. With the intent/line of thinking of this survey, Alberta's water resource will continue to be in trouble. If there is no water available to maintain an industry/community it should not be there. Technology may assist our ability to move, find and purify water but at the current time, if it is not possible, guess what – no mater how much money you throw at it, it's not possible.

- Sensitive aquatic environments must be protected.
- Don't allow future developments below flood plains to prevent the government from having to hand out large amounts of funding for compensation due to flood damage. Existing developments below the flood plain must be protected by dykes or something.
- Confined feeding operations should be required to follow strict operating guidelines to protect surface water and groundwater supplies.
- The Government of Alberta must protect "wetlands" since they play a very important role in ensuring clean drinking water. Wetlands recharge groundwater and purify water.
- Storage reservoirs are a good idea. If this includes dams a thorough study on the environmental impacts is required.
- All users of water should pay for their water usage (i.e. city, industrial, agricultural, etc.), this promotes conservation.
- Protection of the aquatic environment is critical, so we must determine how much water this requires.
- A "healthy" ecosystem is hard to define – must define "healthy." Should a water system be able to support only a certain number of fish species and certain ecosystems? It will depend on the area.
- Use water management plans to integrate protection of aquatic ecosystems with watershed and land use management.
- When allocating water the protection of the aquatic environment must be considered, withdrawal should not be allowed if it will have a negative impact on the aquatic environment. Other alternatives should be investigated such as groundwater or off-stream storage.
- "Water conservation" should be a requirement for all water users including domestic, agricultural and industrial. The province could provide incentives to conserve water. Educate! Various sectors should have targets they must meet.
- Don't agree with inter-basin transfer. It may appear that the north has all the water but this may only be the case because of the large Peace River. The north experiences drought just as the south does. It am concerned about the impact on the ecosystems and the U.S. if water is moved south. The U.S. will take all our gas, is water next?
- Certain flows must be maintained to protect aquatic environments even though it may limit human use. It do believe drinking water must be available in all circumstances. Industrial development may not be allowed due to stream restrictions.
- The province's water supply can only support a certain population and a certain number of industries.
- Regional water supplies should be considered. The government could help setup and then surrounding communities could contribute funding to operate the facility. A qualified water treatment operators salary would be paid by the benefitting communities.
- Why not consider moving people/industries to where the water is?
- It believe the government "pussyfoots" around industry and agriculture - allowing these two groups to get away with contamination beyond what is environmentally healthy. Legislation tends to be put aside. In some instances these situations drag on rather than getting "nipped in the bud" of the outset. By time the "situation" is righted, much damage has transpired. It believe most everyone is becoming more environmentally conscientious, but there are still those who ignore the "rules."
- Fish and wildlife habitat and availability of water have to go hand in hand and the aquatic environments and riparian habitats cannot suffer for economic purposes. Recreational use such as high speed motor

boats, seadoos and cabins should be monitored more closely. Cabins dumping sewage are just as much to blame as agricultural users as well for adding N + P + K to surface water sources.

- 1. It is imperative that the Provincial Government develop and produce legislation with a meaningful strategic program for water and wetlands to ensure an environmental and economic balance is maintained. This must include a monitoring program with TEETH! 2. Part of the program must allow for the restoration of wetlands if necessary. 3. Surface water is part of nature's way to help purify and break down foreign and organic waste therefore restoration of wetlands must be included in a program. 4. These items must be legislated to ensure a level playing field for all, environment and economic.
- It will treat this 'water for life' information kit as a timely knowledge booster, but It can't help asking who and what forces, prompted it's being put before us citizens at this particular time. Climate change, cyclical time of drought, concerns about huge livestock operations setting up, groundwater pollution. In the back of my mind ever since 1988 and Brian Mulroney's FTA, I've been seeing Canada's resources being shipped off to the U.S. and we plebeians truly became hewers of wood and now we are to become drawers of water and have to pay world prices for our very own resources and the Feds can do nothing to stop it. Hell, the Feds even passed that C-36 Bill, December 2001, so we can't even fight to protect our resources. We can't even set our own prices for our exports. Look at the soft wood and fishery disputes - all under the fist of the WTO. Mr. Klein got private hospitals started, now U.S. interests can come in and buy all our hospitals, we'll be buying U.S. medical insurance and on and on it goes. I'm glad I'm an old 1930 vintage south Saskatchewan raised hayseed, tumbleweed, who grew up with rain barrels, cisterns, solid Canadian dollar and the freedom to work for myself to vote in my sovereign nation. It ain't like that anymore. Yes, It do believe this water for life information is the start into water diversion to the U.S. so the printers can profit big time and governments will call it jobs, jobs, jobs for our youth until our resources are all gone...to the lowest bidder.
- My concern is with the total abdication of the Province, by turning over the regulation and licensing of feed lots to the municipal and county levels of government. This results in decisions being made by vested interest only, and creates long-term damage to the area groundwater. We don't need another Walkerton.
- Effective water conservation can be aided greatly by healthy forests. Reforestation should be an integral part of all water programs. This adds a great deal to the health of the ecosystem.
- There are currently no limits to fill-in permits of flood fringes of lakes and rivers. This means the capability of the wetlands to store water (like a sponge) is eliminated. Unless this practice is stopped, we cannot store groundwater anymore. The abuse of water for oil extraction is criminal. Permitting polluted storm water run-off into water bodies is bad. Not penalizing raw sewer overflows into river is criminal.
- The Alberta government needs to stop cutting Alberta Environment's budget so that they have more resources to combat/resolve environmental problems. Public education on water issues is key. Dams or inter-basin transfers are too risky and cause too many environmental problems to consider. The environment can't keep taking the back seat to industry/economic development. Perhaps irrigation should be reduced in southern Alberta as it is a very large user of water. Groundwater use needs to be monitored and a study of groundwater reserves needs to be done. Need to consider a global scale.
- It believe the most important issue is to have a water management plan that conserve water use (both personal and industrial) and maintains ecosystems. It think some kind of water use incentives would be best to accomplish these goals. Education would also help to promote conservation. It have been made more aware of water issues through taking this class and through the water for life strategy. Hopefully this will do the same for others. Thank you.
- As water is becoming a major issue in Alberta, it is time the Province looks at ways to limit growth (the cities of Calgary and Edmonton are good examples). It believe there is a limit to how much growth can take place without seriously impacting water supplies. There are cities in the U.S. that have set boundary limits to further growth. This should be investigated further in Alberta. The Province should not think about large-scale transfers of water form one major river basin to another. It would be unfair for those who are considering development to be denied the chance because water is moved elsewhere. Building more and more dams is not the answer to Alberta's water problems. We only have to look at the Bennett Dam in BC and the damage done to the aquatic environment in Alberta to realize that dams are not the way to go. In the US, the emphasis in some areas it to remove dams. The answer to protecting Alberta's water is by taking a serious look at water conservation, educating the public and safeguarding our existing water bodies, including wetlands.

- The environment and the economy are on a collision course. Unfortunately the economy's king with political leaders the world over.
- There must be a concern with the fact that water is there at times and in certain places (there is no need to just "let it run by"). Our challenge is to use it- but in a sustainable manner.
- Without clean water we are dead! It is essential that we have a handle on what we have; how good it is; what we've lost and how we can make up for that. Economic growth cannot occur without sustainable water supplies.
- The government should not change protective environmental laws such as allowing oil companies to mine beneath wetlands. For example the McLelland Lake Wetlands north of Fort McMurray. Oil always seems to come first in front of water, air and the environment. Golf courses are another large and unnecessary water waster. I've seen water pipes diverted to a course from a fire hydrant.
- It am concerned about water uses throughout Canada. It am also concerned with terminology that states more taxes for Albertans. Charging a fee for water seems unrealistic. Perhaps lottery money could help out with the money required to investigate, construct and educate Albertans and Alberta water systems. It am really concerned with the amount of forest and wetlands that are destroyed by economic growth. It feel developers of all kinds should be required to work around a portion of the natural areas. This could provide for more natural beauty throughout our concrete world.
- Alberta is blessed with a wonderful natural environment. Efforts must be made to preserve our bountiful ecosystem. Industrial growth can and should be allowed. Alberta's pollution should be strictly managed. They should not be allowed to maintain a "growth at all cost" policy with respect to our water supply. Conservation efforts must be forced upon some industries.
- In our zeal to promote economic development (which often benefits or fines people not for a shorter time) we must not compromise the long-term sustainability of our natural system. When our well at Crane Lake was drilled 20 years ago it was an artesian well. Now it needs to be pumped up and levels get lower year by year.
- My biggest fear is that this is just window dressing for a Government who has already made up their mind and will go ahead regardless of the feedback as they have done numerous times with things such as VLTs. If the existing government can't seem to manage the budget without overspending in good times, can they do a good job with water?
- All drainage must cease. Replace any watershed that is removed for roads or urban sprawl etc. Protect all watersheds regardless of size by law. Phase out water re-injection. Implement policy to protect all creeks, so as to prevent bank damage, erosion, siltation etc. Discontinue intensive livestock operation. These operations are major factors in water pollution and consumption. Money spent by governments in draining project could and should be allocated to water conservation strategies.
- There needs to be some discussion of the management structures: 1) establish river basin authorities to manage the water resources and land use of a river basin using a consensus seeking model with representatives of municipal/provincial government business, farmers, recreation users, conservationists. They need to have some very real decision making authority; 2) A data base to track clear outcomes is necessary, with consequences, policing etc.
- Why isn't this treated as a global issue and not a local issue? How many similar studies that have cost many, many dollars all over the world have been done? How come every government and politician wants to reinvent the wheel? Someone please read, "how to shit in the woods," by... and get a basic understanding of what kind of impact our actions have on the planet, please!
- Why in the private and municipal systems do you refer to "drinking water" when less than 5% is used for drinking and food preparation and the balance is flushed. Why are not homeowners responsible in municipalities to ensure safe water through in- house purification? Cities are bringing, at a large cost to society, all water to safe drinking standards even though most of it is used for non-consumption purposes. There is no incentive to conserve water. It have seen fields in southern Alberta with the sprinklers watering hay. This is a waste of water and money. Irrigation should only be used for market garden types of functions and animal consumption. Crops should only be grown where natural conditions permit for 90% of the time. First into a water co-op should not get first water. Water should be divided first to market garden areas then the balance, if any, should go on a prorated basis to land held.
- The government people that have been given the power and mandate to husband these resources are not doing the job they have been entrusted to do. Establish a history of past impacts along with a mental

history and insure that the people are protected and that industry bares the cost of their use of potable water that isn't used for human consumption.

- Most of those issues were dealt with in the recent Water Act. It believe this new strategy is to promote inter-basin water transfer (dams). It do not support this initiative. Most of the northern rivers are near 100% of allocated groundwater use. The cost and damage to the ecosystems will not be sustainable. It see the biggest threat is the resource (oil) industry pumping massive amounts of water into the ground, therefore lost forever. Water is possibly worth more than the oil.
- We are answering as the management committee of Wagner Natural Area, a steward group under Community Services, Ponds and Protected Areas natural users stewardship program. We have attempted to answer questions that we consider to be relevant, or possibly relevant to our interest which is the protection of mineral-rich fens in Wayne Natural Area, west of Edmonton. We had difficulty answering the first 5 questions under number 10 believing that it is premature and dangerous to allocate water when little is known about the requirements for maintaining aquatic ecosystems (see under considerations, possible implications, sect 12). On question 2, under sect 11 we were unable to reach a conclusion, believing that putting a price on water will increase its value (leading to conservation), at the same time fearing the implications of commodifying water. We also reacted ambiguously to option 1, sect 10, because we are afraid of what the effects of groundwater withdrawal could have on aquatic environments. We applaud the objective of maintaining heal thy ecosystems, but at the same time remain skeptical that the government will provide the funding to determine ecosystem needs and will give this objective priority when faced with the competing demands of industry.
- Canada's water belongs to all Canadians and this attitude should be behind any water distribution initiatives. We should be, if possible, sharing this resource with any others who may have a need considering the realities of reserves and distribution.
- Current and future economic development should not come at the expense of a safe and healthy drinking water supply for Albertans. Albertan's health should be a priority - this does not seem to be a priority with this government's mandate for economic growth.
- A safe drinking water supply should be protected and ensured for future generations of Albertans. Conservation and the protection of wetlands and watershed is of the utmost priority.
- Water strategy should address the issue of recognizing private landowners who protect wetlands. Those who alter the hydrological pattern should pay the costs of the resulting impacts.
- A provincial water strategy is necessary to recognize wetlands and watersheds and their importance to a healthy environment. Wetlands help in flood control and providing safe drinking water.
- Wetlands help purify surface water and reduce the severity of flooding. Wetlands should be protected by legislation. The private landowner should be provided with incentives to maintain wetlands on their property. When wetlands must be impacted for important social needs then reasonable efforts must be made to restore drained wetlands or to maintain healthy watersheds.
- There seems to be no limit to how much land gets drained, trees removed etc. We need to hold the water in an area instead of getting rid of it in a hurry - can we educate farmers in particular, rural municipalities to keep the healthy watershed areas we have and stop destroying them. Floods that do damage are sometimes caused in our area most always (especially beyond spring flooding) by the water coming too quickly because everyone is draining.
- Must look more closely at the use of water by agriculture. Place levy (tax) on the users of chemicals to set up fund for safety of water. Stop all damming projects. Develop a water reservoir system. All livestock, poultry producers should pay a per head tax/levy for water consumed by stock. Irrigation projects should be stopped as some parts of Alberta should not be farmed. Require demand by law conservation practices for water. Non wasteful practices (tax breaks).
- To clean the water – get the cattle out. To supply water – have landowners build ponds and fill during higher water flows. Instead of diverting water south, move industry north where the water is. Farmers are the biggest pollutants to the water with abandoned wells and personal waste disposal areas. Chemical handling concerns for everyone but not farmers – WHY? And allowing cattle, horses, pigs to run through watercourses.
- Development "at any cost" seems to be the direction "our government" is headed. CFOs and huge irrigation systems are intensive and extensive users of water and do not provide value when the full cost of developing the infrastructure required is costed into the equation. If these operations were required to

fund the full costs of the infrastructure (i.e. dams, pipelines, etc.) their return on investment would negate the operation. If you cost in the cost to the environment, physically and socially, and if they have to pay these costs from their profits, the government would soon see the folly of their mindless quest for a bottom line.

- Never transfer water . Water is not for sale. Pollution of water is my biggest concern. The new sewer systems force water into ground and into aqua system versus above ground evaporation.
- I may respond again since I just looked at materials in a quick read. However, the workbook is very well done. There could have been more emphasis on conservation, I believe - only suggestion at this time. I will try to think more and e-mail in.
- In the water strategy, conservation and wise, efficient use of water should be at the forefront and inter-basin transfer should barely come up for discussion. We need to provide education to the entire community on conservation, ecology and wise use of water. Education of the adult population is as important as education children. The government needs to have enough control over the supply and production of drinking water such that there is no chance that a "Walkerton" incident can occur here. The government needs to ensure that adequate drinking water supplies are developed so that the influence of drought would be minimized.
- Charges for water: the only time a charge for water should be considered is if water that is upgraded or a co-op leaves the province. Should a fee for services be charged Albertans may be able to pay a small fee for service - through the tax system - but the fee should be regained from any upgrade to water or service if required to leave the Province e.g. U.S., Saskatchewan, British Columbia, Northwest Territories. Alternate focus for water: I believe large rivers may be diverted into other rivers (watersheds) to decrease pressure on demand. This diversion should only occur at high water periods (spring runoff or high precipitation) periods. Groundwater: technology should be increased to improve the quality and quantity of groundwater on a large scale. This may require tax dollars - but the payoff will be well worth it.
- As an Albertan that has two residences, one in a municipality and the other on acreage, I can fully understand the need for a safe water supply. In addition there is a definite need to educate people on water conservation. As our climate changes, we will severely impact our water resource. We must conserve and have a safe reliable water supply. We cannot allow private companies to export our water especially for commercial or industrial use. We must set priorities to ensure that the ecosystem is sustained, that we have water for domestic use and finally to properly treat wastewater.
- Cities should not be allowed to grow above 100,000 people to maintain water on water contamination problems. Industries should not be able to use fresh water or also contaminate streams and lakes aquifers.
- Develop wastewater plans and basins and use the suggestions - actual implementation then enforcement.
- Items 1 and 2 seem to indicate a desire to pollute to the limit. Also, there is no measure of "aesthetics" of dingy water even though it may be not harmful; also - no differentiation between eutrophic, mesotrophic or ogliotrophic lakes which we have or could have. Naturally rich environments - but do not accommodate certain species.
- The FITFIR rule is of major concern. It does not take into account, growth in human population, advances in technology and puts control of the water resource in the past. These licenses are from a time when the whole province and country was different. Farm and industry practices were different and possibly terribly inefficient. Why should control of the water resource be based on those practices? I am totally opposed to a concept where possession of a water license has economic value in itself. Water is a resource for the use of all Albertans in order to live their lives (Shell Canada, or whoever owns them now, have had a pipeline from Lesser Slave Lake for 20 -25 years, pumping massive amounts of fresh water into oil recovery. Probably at no cost for the water. They should have no ongoing right to that water at the expense of the needs of the people. I am sure there are many other situations like this in Alberta). Do not base Alberta's water strategy on the needs of business, but on the needs of ordinary Albertans.
- Population growth and industry immediately impacts environment. The only choices that can be made are how far can we morally take these to? As populations grow, environment has to change.
- As an Albertan all my life (65 years) water was not an issue until the past 15 years. Of concern are: scarcity, low groundwater levels, damage to the ecosystem, and in northern Alberta the growing concern with climatic change and drought. Contamination of groundwater is becoming more and more an issue.

both in northern Alberta and the south. Much thought and consideration must be given to maintaining a balance between the needs of industry/agriculture, domestic and recreational use and all of the other factors that could be considered. A fairly daunting task but one that can not wait, I commend our government on taking a proactive role in addressing this issue "sooner rather than later."

- I feel we should be directing new development in the northern or other areas of Alberta where water is available. By promoting continued development in the southern regions simply compounds their water problems. I feel it is extremely important that the northern region have representation on any water board that may be established to consider the results/direction after compilation of this survey data.
- Best look at existing enviro-problems and how to fix them, wastewater management (waste not - want not, recycle-reuse). Any impact of Robert Kennedy and "waterkeepers" (is this a smokescreen).
- Water is a critical factor in all rural development issues. Currently, most development decisions are made in isolation from water issues. We need to find a way to integrate water and other development decisions.
- Limit growth (or use of water) before over allocating water. We cannot maintain ??? water in rivers during drought for aquatic ecosystems.
- I strongly disagree with the provision of first in time, first in right with respect to the unrestricted use of that water. Under no circumstance can water be allocated for economical reasons ahead of human life sustainability. It is imperative water does not become a 'saleable" commodity and fall within the scope of NAFTA. Alberta's water belongs to Albertans first and foremost under all circumstances. We cannot be bullied under NAFTA to have to compete economically for our own water. We would surely lose a battle of this type which would totally destroy life in Alberta as we know it. Even if our current belief is that water would not fall under the scope of NAFTA, it's conceivable that the U.S. could overturn our beliefs by throwing unimaginable dollars into a legal battle in world courts. Along with economic incentives for water conservation, economic penalties should be imposed on municipalities, companies and individuals wasting water.
- Irrigation of low value crops is not wise use of water. It's time to look at diverting northern water to southern Alberta where the population is. We need more private corporations involved in water management. Both Walkerton and North Battleford involved government. They simply can't be relied on. No accountability.
- Water needs to be treated like any other resource. It will not be here forever if not managed well.
- The old seismic holes in the green area on the right of ways should be filled up. To maintain groundwater and protect aquatic systems in that watershed. Also help wildlife from getting hurt while crossing these old right of ways.
- We must stop potable water being injected for oil recovery. It is criminal to do away with water that will never be replaced or usable again. Forestry [practices] for watersheds and effect on climate needs to be studied as well. Better education re water conservation and education but not by using a economic incentive.
- Someone up there has to try thinking outside the box.
- I believe provincial and federal government to remain in control of water sources and uses as well as distribution. Keep water for people and future as well as a fair degree of development. We do not need globalization in factory farms and large industrial uses of potable water.
- With the new water act the government has assumed ownership of the resource water. We have to have a permit to use water. How can or will the government guarantee supply.
- Look into an effective way to eliminate evaporation from stock ponds, irrigation canals and dugouts. Look into more efficient ways of irrigation less evaporation. Cut out deep well injection of potable H20. Be careful on your assumptions of a healthy aquatic environment, scientists have an assumption that nature is not cyclical.
- FITFIR is not the best but I can't think of a better alternative. The issue of assigning value to water: Although we all know it has a finite value, we still expect it to be free for personal consumption, like the air we breathe. It's a paradox. If it has no value, we waste it. If we give it value, we have to pay for it. I'm not too concerned about the aquatic environmental issues, since they adapt to change, and are capable or relocation, given adequate time.
- Review AEPEA - re: Water Regulations Act. These regulations treat water as an inexhaustive resource.
- Civilizations were not lost because of wars, they disappeared due to lack of water. We must plan ahead for seven generations. We must encourage landowners to maintain their wetlands and discourage

wholesale clear cutting in our forests. Intensive livestock operations and factory farms will pollute our water ways and our groundwater. We must stop injecting potable water into oil recovery processes.

- Healthy aquatic ecosystems and watersheds, wetlands and riparian habitat must be the first consideration in all water allocations. Best technology and education for and of water preservation must be a strategy of the provincial government and should be implemented ASAP. If 12.2 above is implemented in a timely fashion then it may be unnecessary to implement charges for water. However, I believe a pricing system for water usage should be established. Albertans, corporate and private, must be made aware that water is not 'free and limitless' – if this means being charged for it so be it. Under the last section 'safeguarding Alberta's healthy ecosystems' I notice the words 'please review the following options the Government of Alberta could consider' are used. Why is this written so indecisively when the other sections are more decisive? The government must protect the aquatic ecosystems – there is no could! Industry cannot be given water licenses to use potable water for their processes. Ensure water does not become a tradable good under the federal bulk water bill!
- Questions are poorly formulated and open ended. Any answer can be understood or misunderstood, depending on if you burned your toast this morning or not. Leave the watersheds alone, live within your means in your area, don't destroy nature for personal greed. Every time we humans try to get rich quick, we destroy a little piece of nature, that will change our children's and grand children's lives, probably not for the better. The next generation would like clean water and fresh air too which can only happen in a healthy environment.
- I believe our aquatic ecosystems and groundwater aquifers have a certain carrying capacity for both domestic, agricultural and industrial use. We are at a point in our economic growth where a 'limit' based on scientific research be set so that our future use of water and its ability to remain safe for human consumption be retained. Less than 1% of the world's fresh water is safe to drink. We cannot jeopardize this valuable resource. Politicians (Premier, Minister and MLAs) need to be better educated about this valuable resource.
- Water use must be directly linked with wastewater produced as well. Industry, agriculture, municipalities must be forced to return their wastewater in a clean form. Water conservation practices such as retaining woodlots, and riparian habitats must be encouraged. Drainage of wetlands on private land should be outlawed.
- We need to think in the future on this issue. If we do not plan for tomorrow our children will be the ones to suffer. This must be the focus before any other.
- Water for recreation has not been included in this book.
- Water Act - what is an emergency and how is water allocated? Agriculture over industry! Compensation to farmers needs to be fair. Work with individuals to solve these problems. Bills to end\force water reuse. Ensure compliance. How can we place a great focus on sustainability and conservation when government continues to cut back on their resources. Do not make this a waste of money or time.
- Listen to the scientists and follow their suggestions.
- Before a strong management water plan can be formed one has to educate our politicians. They have to be able to recognize the vast amount of water use and contamination by the four P's: pulp, paper, petroleum and pigs. As early as the late 1970s the government and regulators were questioned on the use of water for industrial users. Some of these people who questioned these issues are now in government and have since turned a blind eye. Alberta now is a day late and a dollar short. It will also take one or more Walkertons to wake up our politicians.
- Apply "first in time, first in right" to surface rights as they apply to petroleum industry and see how much political support that would get. Like zero. Science has repeatedly documented the association between forest canopy removal and an increase in flood events and severe changes in flow regimes. The accumulated impacts of forest removal from all sources, forestry, petroleum well sites, seismic lines, pipelines, roads, agricultural grazing, coal mine, etc., has not been mentioned in any of these documents, but permanent land clearing and long-term canopy removal has been escalating at an alarming rate. What are the real costs? Accumulated impacts of extensive land use will increase sediment loads and destroy water quality and reversal process requires many years of restoration (i.e. 50 to 100 years).
- Maybe we should establish a water resources agency or commission along the lines of the old water resources commission. Could parallel an agency like Climate Change Central and be an independent

body with stakeholder representation to conduct water research, examine management options in more detail and be an advocate for the wise use and management of water. This body would be arms length from government and could get funding from government and key water users/players-industry, irrigators, ENGOs. This would provide a focus to continue the debate and search for solutions generated by the water strategy.

- A sustainable environment is necessary for a sustainable economy. Alberta has to plan carefully so both the economy and environment can be maintained. Educate! Educate! Educate! Businesses operating near watersheds and waterways should be subject to scrutiny (including dumping that takes place by vacuum trucks etc.) As a farmer, I am tired of seeing the waste and damage done by recreational persons or by companies who are here today and gone tomorrow. I have a great respect for the land and would like to see improvements made to Alberta's Water Strategy. I would like to see communications like this taking place in an easier fashion to get all parties involved. Many people do not have the Internet and can't respond to you. Those involved with the environment should be contacted in forums or something along that line. The government is/was putting the blame for a lot of the water woes on farmers, and that is unjustified! We have known there had to be something done for awhile now...please work with us and not against us. Many have been here for generations and the people making the laws are here today and gone tomorrow it seems. Thank you for letting me voice my concerns....I do hope you are really listening!
- Good, clean water is essential for everyone and our future.
- I would like to see a gradual population increase that takes into account our ability to provide cheap and clean water. Intensive livestock operations currently planned for southern Alberta make no sense to me because they would put a heavy demand on the water and contribute substantially to the pollution of the limited existing water. These feedlots are not being set up to benefit Alberta, but rather to export the meat to other countries cheaply leaving Alberta the mess and pollution. Industries such as this should be discouraged. The same with the oil industries reliance on pumping water deep underground as they remove the oil - there must be a better way. Heavy industry should be made to have their own sewage treatment plants that clean the water to a pristine level before returning it to the source. They should also be required to collect rainwater as one of their water sources thereby reducing the demand on rivers and lakes. I don't think that diverting water from one area of the province to another is a good practice. The southern U.S. has been doing that for years and all that has happened is the population has grown in areas that cannot support the growth. If something were to happen to one of their pipelines it would be devastating. It has also destroyed recreation areas throughout the central US, and now threatens the northern U.S. and Canada as the water shortage worsens. If Alberta sets up massive pipelines from northern Alberta to southern Alberta, it won't be long before the U.S. will be demanding the sale of that water to them, especially if private developers build and own the pipeline. I think that NO water supply and treatment systems should be privately owned. The province should own all water.
- I always find the questions in this type of survey 'loaded.' No matter the answer, it is what the surveyor wants to hear. I do not believe there is no information on inter-basin transfer of water. As the idea has been around for years more or less. Other statements throughout the survey say 'there is no information'. What has ??? been doing the last 20 years or so? The statement on page 5 of the booklet about the Peace Athabasca Delta makes me laugh, especially the 'large population of muskrat.' This population has gone downhill since the dam to where there is next to nothing left. If more water is taken from the main watersheds, the delta will change to a dead area with spruce, etc. taking over. In future years I foresee water inter-basin transfers coming no matter what people say. The political votes weigh heavy for such action.
- We must also be aware of the global ramifications. What are our responsibilities to other nations in the light of decreasing water supplies? We need strategies beyond our own borders. Pricing is a good example. If we put a price on water to encourage wise use, we may be required to sell it as a commodity under NAFTA.
- The idea of "first in time first in right" is unacceptable for a basis of water use. Many of the above statements make the assumption that our water resources are in excellent condition now; this is definitely not the case as recent studies are showing. I mentioned the riparian health of our streams earlier as being only 16-18% functional on average. The CAESA water quality study has identified severe quality issues related to intensive agriculture and livestock production. We have no idea of how we are impacting groundwater supplies, other than we have to keep drilling deeper wells which should indicate

that we are using more than is being recharged. Furthermore, we have drastically reduced our surface water storage, the source of groundwater recharge. Quick fix solutions like 'dams' and diversions have been part of the problem and are definitely not the solution. With the projected growth in human populations, it would appear that the people of Calgary will be drinking most of the water in the Bow River, leaving little for irrigation. Government must get out of the subsidization of major water projects, since most schemes are not cost effective. Any projects today that would encourage the use of water (i.e. irrigation projects) would be totally irresponsible since they create a dependence on water well into the future.

- It is essential that government ensures that wetland and watersheds remain healthy to provide quality water so both the environment and economy are maintained. Any wetlands removed for necessary developments must be replaced so there is no "net loss" of wetlands. These wetland ecosystems should be protected by legislation. Remember that wetland loss will directly influence the groundwater aquifers. The water strategy must take this into account.
- Volunteers: retired people are an excellent group who could be trained to observe monitor and report as regards water and environment. Feed us, provide gas money and possible accommodation is all we would ask. Is David Schindler allowed to be involved? He has more knowledge than most.
- The City of Calgary (the most populous Albertan city) does not measure water use by its citizens.
- Water conservation is not a value that is promoted by the Province of Alberta - or rewarded.
- My overwhelming feeling is that the general public needs to be made more aware of the impending water situation. It has been my experience that not all issues are adequately addressed when informing the public. I believe that all alternatives and issues need to be laid out in an un-biased fashion so people can make an educated decision. I applaud the fact that people's opinions are actually being sought out for this decision, something that should have occurred a very long time ago. Finally, I must stress the fact that environmental concerns need to be given more attention than in the past. Economic growth can still exist with proper management, but we need to see the value in our environment. Since it is difficult to place a monetary value on it, it often goes ignored. The health and sustainability of our natural systems is vital in order to provide us with the economic and spiritual benefits we receive from it over the long-term.
- Read "Water" by Marq de Villiers. It was the Governor General's award winner for non-fiction a couple of years ago. Water is a global problem. We do not look after it properly in any country, including Canada. Does the provincial government know how vast the destruction of wetlands is in Alberta? Over 70% gone. Wetlands are vital to our health, to the health of our water, plants and wildlife. What about reusing washing/shower water for toilet flushing? There are systems developed for gray water use.
- I am very concerned about the underlying attitude that prevails in this document. From the options and considerations or possible implications one would think that we could continue to use water in the manner we have in the past and that we must keep looking for more water. It is imperative that we find ways to conserve water by reusing it or by reducing the amount of water used initially. These actions need to precede finding new sources of water. We should not be draining our groundwater sources for irrigation of arid and semi-arid regions of our province. We should not be using potable water for oil well flooding. These are just two examples of use that create problems that need to be rectified. Industries that are compromising our water quality and supply need to be made responsible for "cleaning up their act." Industrial users must be responsible for returning the water to river systems or lakes at least as clean as when it is extracted from the water system. Members of the public need to be educated in different patterns of water use. We should be encouraging economic diversity and economic investment. All Albertans should have ready access to good quality water. This is entirely possible but we must advocate user responsibility.
- Studies should be done by Alberta Environment where there is evidence that human activity is affecting an area's water supply. Lakes and their basins that are drying up should be paid attention to. At present they are being ignored.
- Healthy environments are absolutely necessary to our individual health and well being. Wetlands and water resources generally are of primary importance in ensuring we have sustainable ecosystems. Let's have conservation, natural storage in healthy wetlands, and close monitoring of wetlands and water resources become of prime importance as we "manage" our resources. We need to protect existing wetlands and restore drained and damages ones. Flood protection can be accomplished by flood water retention in the millions of wetland basins dotting our countryside. Big dams and ditches merely cause bigger problems than those they are supposed to alleviate and harm our environment in countless ways.

In any proposal that suggests wetland drainage or water diversion or damming of watersheds for irrigation purposes, total costs including long-term environmental ones, must be considered, as well as the benefits to irrigators!

- Fresh water is essential for our lives and it is limited in supply. We must not pollute our water. Economic growth at the cost of environmental destruction comes at too high a price. We do not know enough about the life (bio diversity) of the earth to know what amount of pollution is not destructive to some forms of life. It is my preference that my government have policies which are respectful of our natural environment. Let us not live beyond the carrying capacity of the land. Let us not use more groundwater than is replenished annually. Let us reduce our dependence on oil. Much water is used to produce oil. The development of wind farms and the use of solar energy is a good start. There are ways to use less water for irrigation. There will be many people even when natural resources are severely depleted. I am pleased to see that Canadians are now assisting people in China to plant trees to try to stop the sand storms. We can create our own desert in Alberta if we try.
- There also needs to be some assistance for water quality societies from the provincial government to have the federal native affairs department enforce water and wastewater standards on reserves.
- Wise pricing of water is an important management measure. Currently people consider water almost a feel good, so do not minimize use and waste too much. There must be a charge for all water used by everyone. Introduce "conservational pricing," where the price/unit rises as the volume used rises. For example, if a person uses 100 litres and they pay 1.00/litre, but if a person uses 200 litres, they should pay a higher price/unit say 1.10 per litre. This system would automatically promote conservation as all users would do everything possible to minimize use and minimize cost. Get rid of the system of volume purchases where the more consumed, the less/unit paid. That doesn't work for water.
- I strongly agree that now is the time to act (or many years ago), to do a comprehensive review of our water resources and anticipate future concerns and demands on the resource. In many areas of the Province our aquatic ecosystems have already been altered or damaged by water management systems e.g. dams reservoirs, water use and pollution. Instead of blindly forging ahead with more water allocations, less enforcement of regulations and a "supply water at all costs," we should face up to fact that we have limited water resources. We need to manage what we have better. I do not believe in sacrificing our aquatic ecosystems for the sake of economic development. Somewhere, a balance has to be reached. I would be willing to pay more for my water if I thought it would aid in conservation - at all levels (municipal, industrial, agricultural). My greatest concern is that some day irresponsible, short-sighted management will result in irreversible effects on our water resource which will have implications for aquatic ecosystems, water use, water quality, industry and agriculture.
- I feel strongly that a policy for management of a public resource should be grounded in the principal that use of the resource will not impair the basic ecological functions that we rely on as a society. In determining what is ecologically sustainable, there is a need to develop clear, unambiguous criteria by which we can measure sustainability. In allocating this resource there is also a need to practice precaution - that is, to respect uncertainty and to avoid poorly understood risks that could permanently damage these essential ecosystems.
- I have typed many of my personal thoughts to some of your questions. I would like to repeat that a healthy ecosystem is a productive ecosystem. It is interesting how our health is often a reflection of our aquatic ecosystem. Maybe we need to add that the protection of our natural ecosystems will protect our personal health. Also, industrial growth is often short-term, in relation for the time in the natural world. Eco-tourism and other such industries are relatively new, but properly managed, can be long-term. Maybe new companies that want a water license in areas that are close to the limit of accountable water should present a new water saving technology before they are issued a water license. Should we use FITFIR to argue the needs of nature and industry?
- Additionally focus on water quality and limiting the potential for contamination and pollution. Companies which are either water intensive, or where operations pose a significant risk to water quality should be required to post bonds to cover any future costs of cleanup or mitigation of environmental damage.
- While Alberta is behaving pro-actively by developing a water strategy before the situation becomes largely catastrophic, it is not addressing the underlying issue. This issue is to investigate and address why water shortages are occurring in an area that is by global standards "swimming" in fresh water. The water strategy is a cure, but what about prevention? Though It hate to say it, It think that global warming may be playing a part in the recent prolonged drought. Water is only one component of the ecosystem.

A water strategy requires an examination of all ecological interactions, such as, the interactions between water, soil, air, plants, animals, temperature, etc. Though Alberta is by no means solely responsible for global warming it is a major contributor, especially on a federal level. Since the amount of water is so dependent on weather/climate, this issue should be addressed (also, Alberta does have a growing population, but hopefully the oil will run out, and everyone will leave, and water problems will be no more).

- As with our economic system, It feel that the environment is seen as an externality in your questionnaire. While I may be seen as idealistic, and therefore not realistic, I think that the real reality of this problem is that we must start incorporating the well being of the environment of which we are a part into our decisions. Not in compromise, not in economic cost-benefit analysis, but in the sense that we must begin catering our industries, agriculture and very growth to the environment, not seeing how much we can squeeze out of the environment before it rolls over dead. We must restructure our entire economy to do this. Following this we must keep the government in control of all aspects of water management and the government must not run these for profit. Instead they must run them how society wants and needs. And never forget that society, intrinsically includes nature.
- I feel it is important to protect our earth, whatever the cost is to society, economic development or other interests. This may be an unrealistic target but it should be recognized that damage we do in one year could take nature 100 years to repair (uneducated guess). With this in mind we must be cautious of any water we use. We can't sell natural resources to private companies and expect them to treat them properly. There needs to be stringent laws, plans and guidelines in place to make sure the environment is not sacrificed in the name of economic growth.
- Take the time to look at how other areas of the globe have dealt with this problem. Privatization has been disastrous for many countries, please, do not consider this option. Seattle has come up with innovative water conservation programs, look at things like this. Really need to recognize that municipalities are using a relatively small amount of water relative to irrigation and industrial uses. This government may have a conflict of interest since most of its vote is rurally-based. In practice, this has meant that the government comes down much harder on municipalities than on rural areas. Cost of water conservation measures should be born proportionally by users. In both rural, municipal and industrial uses, there needs to be an emphasis on demand management and a precautionary approach to management.
- Begin investigations/research into using grey water systems in all new urban development.
- Charging private companies for Water use will help assure the resource in the future, and industry should be held accountable for all actions that affect the environment regardless of economic consequences. I think that a massive Water conservation education program for both public and private is long overdue. Many people are unaware of the issue! Awareness campaigns have proven very effective (i.e. lights off save power). I am concerned with the Water allocation guidelines based on levels to sustain ecosystems. Many areas where we are getting Water are already ecosystems in peril and a review of standards are long overdue. Sustaining an already abused system is not enough – we should work at enhancing the state of aquatic systems. Although putting in a dam creates a pretty lake, it doesn't change the fact that we have destroyed the ecological integrity of the river and many species will be put at risk.
- I feel that we can learn a lot from looking at other country's policies for water conservation and management of water resources. I feel that water is the last "public" resource and should not be placed in the hands of profit maximizing individuals (corporations and industry). Albertans feel they deserve good water, but they are never willing to sacrifice economic growth. I think economic growth will not always be this high and we should be thinking about other non-market values (environments and ecosystems) and how they will be effected in the future by our decisions in the present. If it costs more to taxpayers, hey that's the harsh reality of living in the best country on earth!!
- This and additional forums/investigations/etc. should not be used as an excuse for further delay on action on these and more water based issues. The Alberta government has a responsibility to its people (its voters and its taxpayers to "get on with it").
- General Comment: Section about "healthy ecosystems" mostly about study, not any action. The other sections have actions. We have to make choices given the current state of knowledge. Note: I refused to answer a few questions because they were poorly worded or were ambiguous. For example 1c "water availability will limit growth in Alberta:" I can't answer as it shouldn't but likely will given penchant for Alberta Government to bend over to satisfy desires of the "chosen ones" (oil and gas, southern farming). It's almost simple: involve pricing and transferability and stop trying to spend my tax dollars to support a

"handful" of people that want to grow sugar beets in a semi-desert. If they can't make a living in Empress let them move on - bring on the bison.

- I believe in this last section (#12) that it is very narrow minded to use the phrase "aquatic environment" as a focus of study. I believe that one should expand the focus of study to "watershed environment/ecosystem" because few species of life depend on water for their entire life cycle. Water issues are important for aquatic and terrestrial ecosystems - integrally linked. For example, amphibians and many insects need the water and the surrounding land. Flooding of watershed areas promotes cottonwood forests in river valleys. These are necessary for birds (many species) and bats and migration of both. In other words, aquatic life (e.g. fish) is only a small portion of the entire picture. Please consider "watershed ecosystems" not just aquatic ecosystems.
- As an environmental science student at the University of Alberta, I am aware of the issues related to water management (supply and quality) vs. economic development (exponential population growth). I am glad to see this survey being conducted, this is an issue that needs to be addressed NOW, and not at a later stage where it reaches a crisis level......at this point money will dictate the future water, leaving ecology and sustainability in the dust......sounds like something out of the goddamn movies.
- Page 9 of environment for live "we suspect Alberta has large amounts of groundwater" a suspicion is no ground which to make decisions regarding water use particularly since on page 11 there is no requirement of industry to use saline waters from below the 400 meter level where sweet water suitable for domestic use is forever.
- Alberta must not harm the environment to facilitate water-inefficient economic growth. We should rather make wise use of water within each basin!
- Water must stay in its original watershed and may not be consumed. It must remain uncontaminated by human use so that it stays in the water cycle. Rights for water to sustain life are guaranteed by government legislation (human life, animal and plant life). Any industry that has a potential to pollute water is monitored closely by the provincial government environmental agency. Many industries cannot be trusted to police this issue as profit is their only goal. We must protect our water supply at all costs. Water must not become a commodity in a "market driven" system.
- How many people in each basin? Everyone should have a water meter.
- Education of all is most important. Put out information like Environment Canada has "2 Water Fact Sheet 1990 Cat#EN37-81-2-1990E"
- Show flow from each river and stream in each basin. How much is the water flow in Calgary and Edmonton and what does each city return to the river?
- Calgary: 5% consumed of Bow. Edmonton: 12% consumed of the N. Sask. - these numbers don't seem correct.
- Advise people and help them to change their lawns to the type that use less water.
- Alberta Government must take a strong position with respect to our water resources and know when to say "no" to poor water management practices. I realize that education is a fundamental way to achieve good water management practices, and I know that legislation means that need for enforcement, which costs money and sometimes votes. But we have to have backbone and know when to say no and impose no.
- Getting a better handle on industrial use and what is reasonable i.e. power plants, oil well flooding and industrial usage. Visit Louisiana on Mississippi River to see shut down plants due to excess damage to environment. Cancer alley.
- The questions all are based on the assumption that there will be continued growth in the exploitation of provincial resources. It's time to consider a zero growth economy in which we decide that we have enough and we will exchange future prosperity (beyond the level of comfortable security) for the security of a sustainable eco-system. Insufficient attention is given to the affects of unlimited extraction, with ever greater productivity, at the cost of a degraded environment. Nothing grows forever. I do not want more bacon at less cost if I have to support mega hog barns. I do not want cheap oil and gas if the alternative is reduced water. The time has arrived when the question "do we have enough to be happy?" must be asked. Is more stuff worth the cost? In Alberta we passed the break even point many years ago.
- Agriculture is the largest consumptive user of water in the province by far. Most economic studies show that large irrigation projects involving dams and diversion are a poor investment of public dollars. First priority must be protection of the environment. Protection upstream leads to high quality water

downstream and reduces costs throughout the cycle. Water needs to be apportioned to the highest economic value chains following adequate provision for aquatic ecosystems. First in right based on first in time is not a reasonable approach for the 21st century. However, first in time rights holders, should receive some level of compensation for their rights should they be transferred to a higher value user. A system allowing collection of royalties (water is a publicly owned resource much like oil and gas) for use combined with ability of the right's holder to sell their rights, may provide a balance between public and private interests. Pricing (royalties) will also drive conservation as consumers and their suppliers will be able to reduce costs through reducing volumes. Water rights should also be adjusted periodically based on best technologies. For example, more efficient use of irrigation water should be increasing water availability over time. An irrigation farmer who is keeping up with changes should require less water. Water policy should structure the marketplace so that there is an incentive for all water users to move to more water efficient technologies over time. Innovation can make humans more efficient water users over a fairly short time scale. Ecosystems do not have that ability and thus must be protected.

- It is difficult to have any confidence in a singly-focussed government, one for whom growth is a be all and end all. My greatest fear about water is that privatization may be foisted upon us. Publish results of survey.
- We have to look after the water in Alberta. Look at all types of pollution that gets into the water system. Farm operation, take from road run-off. From city sewage system, pays out lagoon system. Air pollution on and on. You can't do one without the other. Enforce is a very important part. One must only look at Edmonton and all it's pollution the city itself ??? from road industry that pollute and no enforcement from cattle, livestock in/on lakes river, stream.
- We need to develop all our resource today in order to preserve them for tomorrow. The environment must also be protected but technology and progress are unstoppable. So let's progress with care and concern and use technology to our greatest benefit.
- The best ideas are the ones that deal with water conservation. If we all make responsible decisions about water use, I think the water-scarcity and possible crises will be avoided. Water conservation technologies, implementation of best practices and ESPECIALLY public education are the options I view as most viable and useful. Putting a cost to water use would definitely help curb use and encourage more responsibility, and I think it should be done before we do reach heavy shortages. Also, lower water levels concentrate any toxins or pollutants in a water body. We should maintain levels of water in aquatic ecosystems not just for the ecosystem itself but for public health, recreation and quality of life.
- The government should put its funds into conservation, promoting best management practices, and encouraging integrated watershed management. Dams and other infrastructure provide much less return on the dollar than demand reduction strategies. It is time for governments to facilitate change in how we use water, to prevent problems in Alberta from getting worse. The practice of pumping fresh water down oil and gas wells is a serious drain on our resources. This practice should be stopped or prohibitively taxed to encourage the development of alternatives.
- Water is the single most vital element for life (along with oxygen). It must absolutely be treated with utmost care. For far too long, we in Alberta have had a very cavalier attitude toward its use. It's high time we made the public aware of the impending problems and crises. Industry cannot and should not be allowed to use, contaminate unlimited amounts of water, which they currently are doing. (e.g. the petroleum industry). Another threat: factory farms. The government of Alberta has to stop giving preference to industry at all costs, which is what the Klein government is doing. It is very scary to think how drastic the water situation can become in a very short time if the government doesn't take fast actions NOW.
- Wetlands take priority over everything else. Municipalities and agriculture and industry should use bio-filters and artificial wetlands. A survey should be done to see how much development an area can sustain depending on the areas natural resources (i.e. Okotoks decided their area could only maintain a population of 30,000 people). Assistance should be available to farmers who want to switch to organic farming. Intensive livestock operations can use manure in bio-digesters for gas to supply their own electricity needs. I think the people in Alberta Environment know what they are doing, it is the politicians that scare me.
- I fear that ever growing factory farms in Alberta with the provincial government having the final decision power rather than the municipalities involved, present a danger to our water. There should be strict controls regarding the use of toxins, such as weed killers or insecticides in agriculture as well as

residential areas, in view of possible contaminated runoffs. Control of water usage, whether in agriculture or industry, should stay firmly in the hands of the government, rather than be contracted out to the private sector.

- It always concerns me when policy makers start talking about maximum limits - this usually means that what the impact - pollution, water diversion etc. it always ends up going to the maximum. Why not look at practices that minimize or reuse the need for water - pumping water into wells to recover oil renders that water useless - there must be other ways with less impact.
- It sounds as if the government is intent on privatizing our water systems and I am vehemently opposed to this scheme. I am also opposed to private companies monitoring water quality – look at Walkerton!! I hope we have learned from that. I am very concerned about 1. large scale hog and cattle operations being proposed and how that will contaminate our environment and our water, 2. What the oil companies are doing to our environment and our water. 3. Building further golf courses should be discouraged. They waste water and the fertilizers pollute our environment.
- Not only am I willing to make changes in my life to protect water, but I would like to see incentives for all Albertans to do the same. Our water is ours to be stewards of not ours to own or exploit. Priorities for water use (by humans): 1st - food, 2nd - shelter, 3rd - clothing.......$9x10^9$ - monetary wealth, $9x10^{10}$ - oil industry.
- Enforcement of present water regulations is essential and this questionnaire does not mention it very clearly. There is no mention of drawing on existing knowledge in other provinces or countries where these issues have been addressed. We are not re-creating the wheel. Do not waste the time of the citizens of this province by not doing anything about water concerns. Why do economic gains have to take precedence over environmental concerns? Water is important and is essential for daily living and water conservation will sustain the people (i.e. aid them to live). Why is this not enough? Water diversion procedures are not what this group seems to be recommending, water conservation is what this group recommends.
- Prevent deforestation - no clear cut logging, control areas of logging - prevents soil erosion etc. Education on the use of chemicals - pesticides, herbicides, fertilizers. Establish high pollution standards and penalties and ensure that they are enforced. Farmers should be educated in land management (e.g. farmers should not be allowed to cultivate land that is not suitable for crops). Standards should be set up to prevent this from happening. If they do cultivate this kind of land - no water should be allocated for irrigation. Standards and criteria should be set-up as to the best economic and realistic use for water (strictly enforced). It should not be based on 'first in time, first in right'. Management of water should be non-profit and non-partisan. All revenue from water should be put toward water management and conservation. Government should be involved in setting policy, procedures and standards which are strictly enforced and penalties should be high and strictly enforced. Ranchers and farmers should be encouraged and assisted in digging dugouts, etc. This may prevent the use of groundwater, etc.
- Top priority should be the aquatic life in any waterway. Next should be human requirements. Next should be agricultural food production. Next should be industrial production. Last should be future considerations. Now is today. There should be no inter-basin transfer ever and no consideration to divert flows to U.S. The farm irrigation canals in southern Alberta are antiqued disasters of inefficient management. Loss of water through poorly maintained systems must be a thing of the past. "Fix it or lose it." We would have sufficient water if was managed to address "efficiency" first. You waste, you pay. Dollar value must never prevail over life, aquatic or human. If corporations disagree there is lots of water in Saskatchewan and Manitoba. Being rich isn't always right.
- Terms like "healthy, balances, values, additional protection, etc.," are all relative items and are defined differently by each user. They also charge with time. Therefore, we are trying to develop a plan for which there are no deep definitions and is a moving target. A great deal of research and public education is required.
- Oil and gas seismic charges must be stopped to prevent destruction of groundwater aquifers, disrupting the mineral settlements, changing the quality and usability of the water. Also, pumping water down oil wells is a future disaster since the fluidity will flow out of the oil reservoir and contaminate water. Intensive livestock feed lots use tremendous amounts of water and manure sludge that overwhelms the natural decay process. This leaves all area residents at risk and the rest of the food chain. I am concerned that Ecoli is now found to be part of plant cellular structure in lettuce as it is not destroyed in photosynthesis. Our government must look for support into new less polluting forms of energy. We must embrace Kyoto.

We must reduce consumerism and demand products of quality and long usage. Planned obsolescence is costly and destructive. The last great improvement to health care was the result of reduced pollution, stopping coal burning. Water and sanitation and food availability – it is time we again recognize these important issues and take care of our environment. Since air pollution affects the water cycle, I would rather have the Water Keeper Alliance – Kennedy come in and fight for quality water in open court rather than have federal or provincial government sign away our sovereign rights in GATS NAFTA MAI to multinational corporations behind closed doors. Therefore local people must have a say in the affects of local industry with review process. The approval for intensive livestock operations and industry must be with the local residents. This government must be responsible for adequate funding to Alberta Environment so that independent scientific information and monitoring is not influenced by where the next contract comes from. This also requires enforceable standards, not acceptable guidelines that are often broken.

- Some points are out of date and some points should have been worked out a long time ago. Some points which the government is asking us, it sounds like +we have little knowledge which we really have. I think the government is unkind and doesn't understand the risks and acts like kind of dumb. They must listen to people in Alberta more and take care of us kindly. Sometime you treat us like grade one or less. Since Ralph came in everything got "not better" and he closed his eyes and ears to everyone in Alberta. I have been fighting my battle with government for five years and it been going in circles all the time. I think the final answer to talk with lawyer to get help (social service and WCB system). Ralph is making all MLAs in his party play games with us and give less money and less values.
- Successful implementation of the Water Strategy depends on a strong leadership role by the provincial government. Strategy implementation will also require significant, stable financial support from the provincial government which is not subject to annual budget fluctuations tied to provincial resource revenues.
- Community league, agriculture societies should be proposing land use multi-stakeholder co-ops that unite the human ecology needs of neighbourhoods that deal with food security and community gardens as co-generative subjects that could synchronize with water recycling phylo-remediation water treatment greenhouses. This could restore a community commons that will help revive the community's team processes, and will serve the cause of purifying water more effectively than chlorine/flourine and charcoal-sand-gravel systems. Ref: Terry Lab, University of California, bio-sciences, Berkley Campus.
- A watershed management plan throughout the whole province must be created. Strong regulations for protection and strong enforcement must be imposed.
- The factory farms we are allowing (both pig and cattle) are not being properly regulated. If we add 12,000,000 pigs to Alberta, it will be like adding 12,000,000 people to Alberta, waste wise, yet these farms are not required to set up proper disposal systems for the waste - not only the manure but the antibiotics that are being injected and find their way to our water supply are dangerous. We do not need these factory farms. Whatever benefit they would give to our economy is too big a price to pay environment wise (including water). I believe there is technology available now that would allow the oil industry to use a lot less water in their industry (however more expensive). I believe that they must use the alternative - whatever it is and whatever the cost - the water they use is more or less permanently lost to the environment and this is unacceptable.
- These responsibilities and costs must be shared by all Albertans, not just business, governments, and property owners. Access to our water resource outside of our border requires a genuine spirit of sharing which is equally applied to all parties involved. The soft wood lumber issue is just one example pointing out the need for an improved strategy coupled with an accurate estimation of the other parties' intentions.
- If we want to use groundwater resources to support current and future municipal/agricultural/industrial development, there will have to be a commitment by government to map groundwater availability. Don't put more resources into investigating water diversions between watersheds. Develop realistic prices for water use (agricultural, industrial). Any made-in-Alberta plan has to consider global consequences. I am not advocating or supporting sales to the U.S., but their problems are likely to become ours in 25 to 50 years.
- Quality of water is successfully being worked on through the EASA programs and a big percentage of the rural and urban populations are using bottled water already, regardless of their source. Quantity of water depends a lot upon seasons; pipelines may have to be built to certain towns for domestic use

(including livestock) but not for oilfields or golf courses, etc. Taxing wells on water? NO! Don't even think about it. Keep the Alberta Advantage for the people at large. It's the only thing we have left. Keep an eye on the individuals who will take advantage of the Alberta Advantage, be it bureaucrats, financiers or politicians who see water as a commodity for sale. Avoid making this water issue a bureaucratic nightmare.

- Introduction - Water for Life - seen relatively few water management conflicts. This glosses over the fact that an estimated 150,000 wetland acres have been lost in the last 25 years in Parkland, Alberta and that there have been consequences through flooding or lack of water due to this. Unlike irrigation issues this has been a silent conflict. Please use wetlands inclusively at all times when referring to watersheds and their components. Their role in watersheds is likely far greater than widely recognized and needs profiling. I commend the underlying message in this process being that watershed management is key. This is not only comprehensive on the science side, it also brings people into a common focus: drinking water.
- Government must regulate location to make sure high use and pollution are located to [have the] least effect.
- The use of water for industry and farming should be more closely regulated and large fees should be implemented in association of industry and farming practices to compensate for use and effects on the aquatic systems.
- According to the National Geographic, the population is supposed to double by 2040 in North America, so these issues should be made a high priority, because not only will it affect our lives and livelihood but our neighbours to the south will handle the situation.
- It seems that after getting everyone to register their water wells the government is now going to tax use. It also looks as though the direction the government is trying to go is to direct northern water south and probably eventually sell water to the U.S. The future of water in Alberta is in the hands of the present generation. We should be looking at our use very far into the future, if we don't we will be jeopardizing our children's and their children's future in this country.
- In-stream flow needs to be established for all rivers in Alberta.
- An interim wetland policy has already been developed - use it.
- There is a need to reduce/control demand.
- Watershed management plans need to be developed and implemented.
- Why does Alberta fund dams? Why subsidize ag-business any further?
- We (Albertans) own $4.3 billion of dams and canals - when are we going to get paid for them by the user.
- I feel there is too much emphasis in this proposed plan on profit taking. I am pro-business, but there are many factors other than money involved.
- Municipal water supplies for residential use should be given priority over other uses.
- There must be a common ground between growth and sustainability. There seems to be a great deal of waste that is accepted throughout the province and with less waste, our position would be considerably greater. We must educate people to the reality of where we are and where we are going to better justify how careful we must be in order to maintain our known way of life.
- Agriculture drainage patterns must be monitored to protect ecosystems from inappropriate run-off and undertaking inappropriate drainage alteration.
- We also farm. Tthe registration for traditional agriculture use under the Water Act should stay with the land when rolled over to son that was farming the said land 1996-98. Registration applied for March 2001 in sons-dads name.
- Do not send any of our water to the U.S. They have shown that they are not really adhering to the NAFTA agreement when they put tariffs on our products going down there. They want our water, our oil and our power but believe we should give them to them. Also do not allow anymore large feedlots or hog farms. Our water supply on our acreage has decreased because of the feedlots and hog farms close to us. Also we are concerned about the purity of our water with all the manure being spread around us.
- In Canada, we have viewed our natural resources as limitless. We are now learning that this isn't true. We must realize that there are limits to how much we can take. Eventually economic growth will be retarded by the limits of our natural resources. Either we take steps now to adapt our lifestyles to a more realistic expectation of "wealth," or it will eventually be forced upon us as it has been in Walkerton.

- First three objectives in the water strategy should be in order of priority: if our environment is not maintained, we will have a much poorer economy. Wetlands provide many societal benefits, the strategy should address recognizing private landowners who preserve these on their land. Those that adversely impact wetlands and change hydrological patterns should be held accountable. Alberta is already paying a price for water. We have decreased quality and quantity of water which has reduced our quality of life. Paying for water is just another "hidden tax" by this government. If you are sincere about water conservation, you need to change people's beliefs and value system for long-term change. The best lesson for all to learn is to have no water when you turn on the tap. Let's ensure we do the right thing - not just do something right!
- Albertans need to plan carefully so that both the economy and environment can be maintained properly.
- Please no more Wapiti River b.s. as it is still a mess from the mill down. Just take a boat ride and then say all is okay??
- Uses of water from plant to water golf courses or greenhouse uses before returning to river is a very good water system (great water usage). As in Devon.
- Your statements seem to indicate that water is USED. The water we use is quite transient and when discarded (household or industry) is USED by people and industry downstream from us. Of additional concern to me is the subsurface process of water e.g. to replace oil pumped from the ground and the effect of subsurface use on overall groundwater levels. Find out why many of our lakes are way down in levels.
- No export of water. Protect water sources but remember humans and animals need water too. The wetlands and watersheds are important to a health environment.
- Ecological integrity is vital but we also need to consider economic growth. We should currently invest in finding out what the needs of ecosystems are. This should be done without the environmental rhetoric and objectively judged. Some systems we will find require very little while others may need a lot. We need to know what is out there before we can know if decisions to promote ecological diversity or economic growth are the right ones. Economic growth may be better in some cases and ecological integrity in others.
- Sustained economic growth is dependent on a healthy environment. If the environment is degraded the economy will not sustain itself in the long run. Watersheds include all water sources - wetlands, riparian habitats - not just the water itself. Water supply depends on healthy riparian habitats and wetland areas. We have a responsibility to protect and restore our wetland riparian habitats for the future generations of people and wildlife!
- A provincial water system should be important to the government. This is such a huge issue that it is beyond the capacities of individual municipalities. Money should be allocated for regional water systems to ensure the most effective use of water in the province.
- Drinking water should take priority over other uses - change is needed.
- Supply of good quality water has been taken for granted for centuries. Users have not been held accountable for responsible use of water. With a forecasted shortage of good water comes increased cost at all government levels. Local governments must introduce policies for the effective management of water (e.g. users fees based on total cost recovery). In this instance, the consumer will most likely be more conscious of water issues and be motivated to use better water management practices.
- Under no circumstances should inter-basin transfer or river re-direction be allowed. If water availability becomes the limiting factor to economic expansion and growth - so be it. Under no circumstances should policy be established to allow or promote economic activity in areas where water is limited and current policies such as those that promote unsustainable irrigation agriculture should be rescinded. Policy should be put into effect to maintain and/or expand woodlots from a water conservation/storage point of view.
- I am concerned that another study is taking place. Previous recommendations have not been enacted. What will the outcome be?

Red Deer and south

- I work in south east Alberta and my Uncle's family's have ranched there for years (1919). This area has always been marginal as farm/ranch land. If it were not for the Tilley Aquatic systems, this area would not be viable farmland. It has been identified on your soil maps as marginal. Please do not move water from other basins to this area. As populations grow so do water needs. We will need the water we have to support our growing needs.

- Increasing population brings increasing industry and therefore increasing pressure on water. We tend to consider water basically either to drink or in industry on agriculture. However, we must also strongly consider water as a source of natural beauty - as a necessity of wildlife and fisheries as well as recreation. We tend to consider water resources as controllable by money - but is a natural aesthetic and necessary for sustaining wildlife - our heritage - which is why people like to come here anyway.
- The idea of selling water or moving it out of the province by ditch or other means, should be an item that is not negotiable in any way or form. This practice of pressurizing oil fields must be stopped immediately. That water is lost forever. We cannot manufacture water. There are other ways of pressurizing oil fields. I don't believe that farmers should have to pay for water out of the wells they have paid to have drilled. The farming industry is under so much stress now. I am sure the average person doesn't realize that their food comes from a farm and not Safeway. If you are willing to kill the food supply, then what? Remember that we have years of lots of water, then there are years when it is in short supply and this is what has to be considered in planning expansion.
- Should investment in infrastructure include nature's infrastructure? Fencing off rivers takes materials and labour and ongoing maintenance. Rehabilitation of riparian areas includes improved grazing practices as well as tree planting. Currently there are over 30 watershed groups in the province. If we're going to improve riparian areas, and we should, then these groups are in an excellent position to work with government. With changes in the Agricultural Operation Act, these groups can educate and assist individuals with changes. This is a better alternative than enforcement which should be the last resort.
- Discourage factory farms. Establish conservation incentives. Hold councillors responsible for decisions to let developers over-develop. Government has to be proactive in protecting wetlands. Water meters should be installed everywhere. Oil industry should be stopped from injecting water into wells. Water cannot be sold to the highest bidder. The Water Act should be changed to give priority to human population over animal population.
- Alberta has two priorities to concentrate on water quality and quantity. We must maintain clean, containment free rivers and groundwater sources. Land usage must by regulated to keep industrial and agricultural waste out of our watersheds. The water quantity problem in Alberta is a conservation issue not a shortage of supply! All water users must be educated in wise use of this resource. Southern Alberta must learn to better use the available water more effectively. Increases in agricultural use should come only after increases in efficiency of distribution systems and pivots are in place. Water for irrigation should go to the users that grow the crops that have the highest economic return for the volume of water used. We as Albertans cannot afford to build any large scale diversion projects. These projects are always white elephants with no financial return and hidden environmental costs.
- We will get the kind of world we are willing to work for. We (if we wish to survive as a species) have to consider environmental impacts. What will be future costs? You can live 4 minutes without air, 4 days without water, 4 weeks without food. Quality is sustained by the earth's climate, hydrological cycles. We stress those cycles at great risk. These have to be priorities over how long (or how well) we can live without "economic development." Do you really believe that today's humanity is any happier than humanity in the 19th century? 18th? Even since the 1950s? I believe the "decline" of any empire, including the Roman, was hastened by decimation of natural resources. If not inevitable.
- Water must never be treated as a commercial commodity. Water must be treated as a resource available for the public good. The trading of water licenses must not be allowed. Water may be stored by commercial users but not diverted for "other" commercial uses and stored water must be released in cases of emergency.
- Need to manage water where it is available, encourage development where the resources (including water) are available. Establish best practices for use of water, how to maximize water use efficiently and what uses of water should not be considered. Develop standards and measurement for non-point source pollutants like agriculture run-off, municipal storm water, industrial run-off. Government has very poor understanding on total pollutant loads to streams and rivers. You need to control/limit all pollution sources, not just point sources. Need to do monitoring of major rivers to establish impacts and volumes of pollutants from agriculture run-off.
- I participated in this process because I believe the issues are important. However, I am very cynical about the whole exercise, given the conduct of the Klein government. For example, a public consultation

told the government to eliminate medicare fees and the government just recently increased them substantially. Local authorities have been backing ILOs especially huge hog operations and the government has responded by stripping local governments of the power to prevent these operations that local people do not want. I fear that if this process tells the government what it doesn't want to hear it will simply ignore it as it has done with other public consultations.

- We must ensure a healthy, aquatic environment, encourage conservation, determine maximum phosphate levels, identify very sensitive aquatic areas and develop water management policies that protect the environment. Unfortunately, there has been a perceived. It is unfortunate that in the past, the government has not led in education and policy to protect our water supplies.
- Any changes to the management systems or regulations of our aquatic systems should be to the benefit of the health of Albertans first then the environment and then the economic status of individual Albertans and future Albertans.
- We should pay for using water either via meters, licenses or setting up our own supply (e.g. a well). Water must never be traded as a commodity by selling part of your allocations. Licensed allocations should be based on use of "best available technology and practices" so that wasteful uses such as scatter spray irrigation and oil well worker flood injections are eliminated (heavy penalties needed). No more dams. No water diversions. No water basin transfers. Why do we need more economic and population growth when it leads to more environmental degradation?
- It's not as complicated as it seems. If there are bugs, fish and plant growth it has a healthy state. Crystal clear water without life is disastrous (Ontario lakes). If we protect our fisheries and wildlife, we also clean up our act. Extensive livestock is the death of rivers such as James River, Medicine and Little Red Deer. They are not intended as conduits for cow shit.
- Groundwater studies in our area (west of Innisfail highway) have not been done. Red Deer County has not had a groundwater study. I know this because it was identified at the Land Use Conference. It must be done before any of this strategy can be established. AEP has no groundwater data available. Data the oil/gas etc. have is not shared.
- If and when water transfers happen, pipelines should be the only conveyance. Public water should not be commercialized. Unused water licenses should revert to the river (in stream needs or the crown). Private enterprise should develop their own water storage off stream.
- To address quality of water - need to monitor streams, lakes, rivers. Fines given to violators of pollution laws. Incentives to those who exercise water conservation. Fines for those who use more than their share. Determine what is a priority for water use: houses, agriculture, watering parks, boulevards etc., industrial.
- Some areas are now being devastated by unrestricted recreational usage i.e. random camping/motorized off-road vehicle use. The Ghost-Waiporous watershed is an important watershed which needs to be protected. NOW.
- Is there no way through existing geo-maps to plot groundwater?
- Accelerating glacial retreat will eventually lead to large stream flow reductions during dry times of year (e.g. runoff excepted. The true challenge is to match consumption to what will be available, begin by educating and prompting (by increasing costs) soon.
- Number one is public education of the need to conserve water. Why don't you clean the street with treated wastewater? Start with MLAs! Discourage ILOs and put in place measures to guard surface and groundwater from runoff and contamination. Dismantle dams. Cease attempting to "make the desert bloom." Read the historical accounts of how many dams have done what was projected. Protect river and stream edges riparian areas.
- On page 4 you're asking who has the responsibility to pay for water sample costs. In a water co-op with over 15 hook ups, with the current government regulations on small water works systems you could be looking at several samples a week, so 5 a week for 4 weeks costs between $1,000 to $3000 month, plus the costs of the water course, plus the costs of transportation (vehicle, gas, someone's time for trips every week into Calgary by the Foothills), blocked ice only, sample jars, coolers, insurance if you can actually find a company that will insure you is $1800. So yes, the government should pick up the analysis and the government goes by hook ups not the actually number of houses (we have 13 vacant lots which are still added into the calculations). The costs to us are already way up there. Worst case scenario which in the legislation states "a sample is required every time water is added (to the tank)" that works

out to every day as the pump tops up the tank, then were looking at 30 samples a month at $150 an analysis works out to $4500 a month, and daily trips to Calgary during Health office hours with your blocked ice and cooler...do you have the time to take that out of your day everyday except stat holidays...no...and neither do we...Anyway, please keep in mind, we're paying dearly already and we're just asking for some common sense. Your questions are too leading to get unbiased answers. You're asking "flooding will pose a threat to human safety and create potential damage and economic costs." Of course it will, so why ask the question. What are you really looking for here? You have many of those, too many. Page 2(d) "climate change will seriously affect water flows in Alberta." Alberta government is fighting the Kyoto agreement saying climate change is full of holes and no real good science behind it. Page 6 you're telling us "the availability of water is a real constraint to the type, amount and location of economic growth in the province, etc." and you ask if we feel if "water availability will limit growth in Alberta" (question c). You state water will be hard to come by and needs management, then you ask if "water will become increasingly scarce in Alberta." (question a). It just seems you're telling us xxx then asking us to "vote" with agree or disagree questions to see if we believe what you wrote and told us.

- Phosphates have been discussed since the 60s. Our current destructive polluting chemical practices are the problem. Legislate the cause (can a $ growth oriented government be bold enough to break paradigms of a wasteful society?)
- If our environment is not maintained, then eventually our economy will decline. Do not be short-sighted by compromising a clean aquatic environment. Encourage landowners by way of tax rebates to keep wetlands/sloughs as these are 'nature's kidneys.' Wetlands should be protected by legislation making it difficult for anyone to drain a slough.
- No watersheds - the Foothills and Alberta Forests, Provincial and Federal Parks etc. are lacking in interpretation related to water source and Alberta rivers and aquifers. The forestry practices should be top priority in best management plans relative to forestry roads, runoff or slow water release in order that the watersheds continue to supply the rivers. Forestry practices are still considered unrelated to water supply, turbidity and flooding in this document. Recreation - off road vehicles are not considered a hazard to water supply. The destruction to the flora and industry of the forests by recreational pathways must cause runoff and flooding rather than slow release if these vehicles were not allowed. Proper management must be required to previous negative effects.
- It would be great to encourage people to get rid of lawns that require large amounts of water, this is a complete waste. People should be encouraged to engage in xeroscaping and grow plants that are suited to their area and don't require a ton of water. Alberta has a horrible record for protecting the environment, didn't we get a C on the last report card for environmental protection? Anyway, protection of the environment should come before economic growth. Without a healthy environment, there just isn't much else left!!! Don't, under any circumstances, sell our water to the US. Don't let Walkerton happen in small town Alberta.
- I am concerned about the water supply in our province. We need to ensure that all our programs for business, industrial and human growth are balanced. If this means limiting growth in the province – I will support that decision. I am concerned about water diversion and the environmental impacts it could have – if the impacts can be minimized the benefit has to be weighed. I am also not in support of selling water to the U.S. – if we are concerned about our water supply now, we obviously don't have enough to be trading it to other countries or provinces. Thanks very much for the opportunity to participate and provide my comments and concerns.
- If you exceed the ecological limits, and cause a rapid or gradual breakdown of the aquatic ecosystem to create a temporarily economically viable situation for one industry, you will rapidly or gradually lose one or more of the systems supporting in one way or another, dozens, hundreds or thousands of other industries. Beyond a certain optimum level in the complex population, ecology, economy network for each region, as human population and/or industrial pressures increase, there are fewer resources and less space per person or business. We should aim for a high standard of living per capita; not for just more people and more industry. Today and in the future, large areas of exciting ecologically complete wild country are becoming more and more desirable and are becoming more heavily used by Canadian and foreign visitors, as long as they can afford transportation costs to get here. Also, there are some industries that are more highly technical and use some of the resources which we can easily supply, which would gladly establish here if Canada enacted legislation to protect them from the high liability insurance costs they face in the U.S. where people misusing their product ten or more years after

purchase can then sue them for millions for the resulting damage. This results in the cost of their product increase which results in fewer sales, which results in the production cost per item going even higher, etc. The only ones winning are lawyers then another industry shuts down and everyone loses. The same as if we exceed our regional ecological capacity. Beyond certain population levels and ecological stress levels, the cost of living and of industrial production goes up as populations increase, while the income per capita goes down.

- Develop an "arsenal" of aquatic plants, biota (even chemicals) that will restore/heal the environment. What things will absorb pollution? What things will neutralize pollution? On the land, for example, certain trees and shrubs absorb pollutants from the air (ask Los Angeles). Plant them! Maintain sufficient plants/tress to maintain health of the environment.
- Substances (e.g. phosphates) should not be allowed to be discharged to a river or lake. It would be good to know the threshold as long as we are not introducing substances to our watersheds.
- What would be acceptable quality of drinking water to your establishment? I am curious. How would you encourage more efficient use of water to commercial or residential users when some are so wasteful (besides selling prices or costs for users). A proposed method for quality water drinking system.
- To strike an appropriate balance between economic development and the protection of the environment we need to have regional solutions both for water and effluent infrastructure: 1. Make use of economies of scale. 2. Increase likelihood of innovative solutions. 3. Cost effective when spread over more users when treating water and effluent. 4. Make use of cooperative strategies in provision of other services such as life, recreation.
- This is not about balance - ecosystems are the basis of our economy and communities. Protect them first and stop subsidizing low value irrigation infrastructure and crops.
- Fascinating subject. Water is going to be the most important issue to face - greater than energy, economics and industry.
- According to question 12, it needs to be on a worst case scenario, it should not be at a maximum number, but a buffer zone (e.g. Alberta government says lake A can survive on 30 million litres. It is at 50 million litres (present). It should not be allowed to drop right to 30 million litres, but say 40 million just as an example). Large companies/corporations should be responsible from start to finish to clean up contaminated water on and off their property. Septic fields need to be looked at. Alberta Government needs to increase it's regulations and make them more stringent. They are too lenient and allow companies/corporations to call the shots. Alberta Government needs to help pay for new water facilities for municipalities. Storm water should be treated before it is released to the watershed.
- Increased education of water conservation. Increased funding to water conservation friendly users. Enforcement of the Water Act with stiffer penalties for non-compliance.
- Designed q and a as such as this one are great for developing the politically correct responses. However, it may be more important to clearly understand the problems. From my perspective the basic data has a flaw, particularly in reference to the volumes of fresh water available in the province. The information booklet states 0.01% of this water is recoverable groundwater. Intuitively the number appears to be too small. My personal contention relates to the drainage of groundwater down unsealed or unplugged boreholes. This depletes the shallow aquifers and forces deeper drilling for potable water supplies.
- The whole approach herein appears to establish an increased governmental planning and enforcement authority. I see no proposals or plans directed at primary demand management other than pricing. Why not (e.g. encourage recovery and recycling of water used in industrial activity rather than once through) or provide repair services professionals to low income, seniors targeted to assist in replacing/upgrading/repairing leaky or inefficient "hardland" as the individual homeowner/user level (the costs of supporting would more than offset by this not gains). There is a whole host of potential solutions, both incremental and broad stroke that could pro-actively achieve real gains in water usage savings. In the final analysis, if water availability is potentially limited by declining supplies, or increased usage, then some limits to uncontrolled growth may be necessary. Priority one should be determining what "total supply" range really is. I would be happy to volunteer to put these and many other workable concerns into effect.
- The group's main theme seems to be establishing a balance. I fully agree that water is vital, but so is our economic well being. Alberta needs to maintain it's "advantage." We must see that maintaining water

quality will help us maintain this advantage. By spending an appropriate amount on maintaining our water quality, we will ensure our water quality by encouraging economic investment. We cannot be afraid to spend on water as without it, we will have nothing to spend.

- We are heading in the right direction. Education, conservation and implication of regulations will help to sustain the quality and quantity of water for life. Thank you for job well done.
- Albertans, and that includes many who have lived on the land for generations, must be willing to change. The land we live on is changing. "Established" ways of being on this land are being asked by the climate to recognize this fact. Being willing to look at new ways of doing things, changing what type of crops, what type of animal husbandry to suit an ever drying environment especially in southern Alberta. But at the same time recognize the importance of the forested areas and how converting those forested areas into crop production adds to the change that is taking place. How "each" of us looking at water usage on a daily basis, how precious is the resource. The individual, business view will be working with the real issue, rather than masking the symptoms and thinking we can continue the way we are now. It is like taking a pain killer to dull the pain of a headache instead of looking at the causes for it and being willing to change habits, ways of being.
- We need to have an overall plan that balances water use. Maybe we need to limit the expansion of industries that are big water users. We need to really push for diversifying our economy into technology areas. Really focus on how large water users (i.e. irrigation can use water more efficiently. I think we need to revisit how water licenses are issued "first in time/first in right." You cannot think of water by itself. There needs to be an integration of all factors affecting water, forests, land etc. Let's come up with a 25 year plan.
- An understanding of human needs for water and maintaining the natural balance is essential yet my leaning it toward keeping the environment THE priority. I hold this belief as I view the environment essential for our existence over that of economic/industrial advancement. We can always find ways to improve efficiencies within the economy/industry but we cannot always recover a lost or damaged ecosystem. Some of the options available to us re: efficiencies in the economy/industry may be hard to swallow for many reasons yet the bottom line remains the same for me: you can't compromise what you cannot get back. Once an ecosystem or species is gone......it's gone. Economies may go through cycles, some harder than others but thy always recover in some way.
- The last few years of drought in southern Alberta should be a wake-up call to this government. The population of the province is burgeoning beyond sustainability. We are allowing industry to take potable water from our rivers and water courses for use in water flood operations and steam generation. This is absolutely wrong and must change. Our water supply must be conserved and protected for future generations at all cost and if the economy suffers so be it. There is long-term gain for Albertans.
- Maintaining water quality can also be achieved through the use of natural treatment systems or eco-technologies which are both economically viable and offer added habitat and possible recreational advantages. Buffer zones and water quality enhancements such as wetland restoration projects can be rewarded through tax deduction incentives. Public participation and education projects can further enhance public knowledge while creating natural treatment areas where water quality deterioration from non-point sources is evident. For example, a wetland restoration project such as on Nose Creek would have been less costly and more beneficial to water quality than the "groynes project" providing hands on participation for the public and generally increasing water quality awareness. Composting projects and public awareness can lead to a decrease in commercial fertilizer use. It also decreases possible land-fill leachate and adds nutrients to urban soil. Vermi-composting for apartment dwellers should be encouraged. Research money should be invested in technological advancements that would meed industry needs while decreasing water consumption or treating wastewater to appropriate levels for re-use within the system/industry.
- At present, little is done to assist small municipalities to monitor or enforce environmental standards regarding runoff, sewage, grey water etc. (e.g. homeowners on a lake or river shore who have an old sewage field are not required to upgrade or replace it with more effective systems). Protection of riparian areas and river and lake tests need to be a much higher priority. These are some of nature's ways of filtering and storing water.
- The problems will continue as long as population increases. No one will tackle over population the theme is always "growth keeps the economy growing." Solve the problems with water and we will breed ourselves back into the problem.

- One of the largest problems is with existing large licenses that are also very old. These licenses were issued long ago before any concept of population growth and environmental needs were considered. These licenses are outdated and no longer reflect current scientific understanding a societal values. Although agriculture and other industry are critical, continuing on a tradition of use simply because it has "always been done that way" is wrong. It is about time this government got out of the dark ages and realize that we do not want economic growth at any cost. The intrinsic value of the aquatic ecosystem is unmeasurable and maintaining a healthy and functioning ecosystem is our best defense against water quality issues, flooding, etc.
- We must start: Valuing the water, seeing it as a scarce resource, using it efficiently and reusing it, segregating toxic materials (containing them and neutralizing them), harvesting nutrients from wastewater, reducing surface runoff, especially from urban areas. Consider full implications of economic decisions. We must absolutely not transfer water between drainage basins.
- We may have to face the relocation of some farming and ranching families from dry areas in the south of the province. If climate change continues at its recent pace it may become too costly to transfer water to these areas continually. Palliser may yet be right. I believe that the citizens of this province have the right to safe, secure drinking water. Since the Province of Alberta owns all the water, it is the Province's responsibility to provide the safe, secure drinking water. This may be done in cooperation with municipalities, but I object to this responsibility being turned over to private companies. Private-for-profit organizations open the possibility of less standardized safety measures - and if they operate for profit - how can they operate for less and maintain standards? It may be a fantasy but some of us believe that as citizens we have more influence on government agencies than on private companies.
- Evaluate how dollars spent on safeguarding our water means dollars saved from the health care budget. Establishing this information does not mean it becomes the standard amount of water left in a river but rather the minimum. Establishing this information should not mean every body of water can have this amount of pollution. No discharge should be allowed and runoff minimized. Our water and rivers are an economic resource as well - recreation industries depend on adequate water levels and quality for boating, fishing and just enjoying a walk by the river.
- The management and allocations of water between all uses must be done on a watershed basis. This immediately leads to determining water availability, surface and groundwater, and establishing the complex relationships between economics, environment, basic human needs and limits. It is about trade offs. How much growth can a given area in a given basin sustain before other aspects are negatively affected? Recently a study in which I was involved explored non-storage options for a river basin in southern Alberta. This process was challenging in that each member of the committee ultimately needs to come to terms with difficult choices in terms of water allocation and conservation methods. The Alberta Government can play a significant leadership role in encouraging and supporting this type of mechanism at a basin level. It requires funding to encourage the engagement of water resource specialists to facilitate, educate and support these types of planning processes.
- We are accustomed to paying for the gas we use. We must accept that water has an economic value and be prepared to pay for what we use. All sectors of the public must be educated in conservation methods and be forced to pay heavily for wastage. This includes homeowners, agricultural users as well as industry. Farming was developed in the southern part of the province during a period of relatively high precipitation. During dry periods there is not enough moisture to allow farming; land should be returned to grazing and no additional water supplies built. We must protect our natural supplies, including wetlands and forests. The ecosystems are forever; we cannot afford to destroy or damage them for short-term economic gains. Scientific methods for assessing amount of available groundwater and amount of water needed by an aquatic environment are vague and subject to error. We must not rely too heavily on statistics gathered.
- I disagree that the economy has to suffer if water is restricted or protected. I believe that more environmentally friendly business will take the place of those businesses that Alberta does not want (i.e. controversy recently with large scale hog operations). Water conservation enforcement would ensure that we have hog operations that are careful to protect the watershed, not discourage the industry as a whole.
- Caring about water today will help show Albertans how we need to continue with protecting and preserving for future generations. "Water" is "Valuable" and should be "Respected."
- Education of water conservation and determined strategies is very important. The individual may only be able to cut water consumption by a litre a day, but this litre multiplied by thousands would make a

difference. Education of industrial and agricultural personnel must be a priority as they are the major consumers.

- Get moving on these initiatives quickly. Start with conservation incentives - sticks and carrots.
- When doing studies for business, rural, and commercial properties the cost should be shared between the government and the other people involved. The environment is not, as many environmentalists would have you believe, the government's responsibility, it is everyone's responsibility. Bearing that in mind, any expansion or development that is proposed, be it by a housing developer, Suncor, or indeed even a farm, should be examined mainly by the person wishing to benefit and make a profit from the development. The main problem as I see it is that everyone wants a nice, sustainable environment but no one seems to want to foot the bill. Since there is no option when it comes to sustainability the choice is very clear, everyone must pay today, so that there is sustainable water that is clean and usable in the future. If rules such as these become part of the legislation with regard to the environment, I think that the system can support a sustainable water system in Alberta, however the cost must be shared to make it feasible.
- Precautionary principle is paramount.
- Need increased funding to Alberta Environment and the agencies that monitor, regulate and study water and other environmental issues.
- Conservation is critical and the first line of action.
- How adequate are the water quality standards considering the increased number of chemicals that are hard to detect or tests don't check for.
- It is not an either/or choice between sustainable ecosystems and economic growth.
- The Water Act should be revised with input from the A.W.W.D.A. and C.G.W.A. along with the water for life plan input from the A.W.W.D.A. and C.G.W.A. Alberta Environment needs to be more diligent on drilling permits for companies with untrained
- Ecosystems need to be protected above all. They are the foundation for our communities and economies. It is surprising that Alberta is still in the business of subsidizing irrigation during these tight revenue times.
- Some of your questions are leading and/or misleading. The bottom line: There needs to be a minimum amount of water left in the river to support the riparian ecosystem (including the fish!). When that level is reached, no more water is to be taken from the river, no matter what the situation. You don't move water to where the people are (or will be). You move the people to the water.
- By reading an article, I found out that the Eastern Irrigation District allocates three times the water that the Canadian St. Mary Irrigation district allocates. Perhaps the Eastern District is wasting water as the other district seems to support agriculture.
- If we can pipeline oil from the north then we can surely do the same with water for agriculture use. If you look at the costs of the present irrigation districts to the producer, I believe that amortized over a period of time it would be well spent. Not Canadian government money only. Or use a natural trench. I believe there is one already mapped out in 1920s or 30s. In the Rocky Mountains, look at the Mackenzie River, Peace, etc. Note: not to be diverted to the U.S. ever, regardless of NAFTA.
- I believe the most difficult task at hand for the policy makers is public education and awareness. This is making people in arid southern Alberta understand that a green lawn may not be a feasible entity for them. There are many water reuse techniques that could be implemented (more so in new development). Where bath water and dish water can be used for flushing toilets. Reusing this valuable resource wisely is also important. Keep the rivers free; fill reservoirs at times of high flow/run-off
- It's one thing to monitor "non-point" sources of substances such as phosphates perhaps the government should take the next logical step and help our agricultural industry adapt to non-chemical farming practices. If non-point sources are difficult to monitor consider the simple chemical input parameters where else will these chemicals go - if not in our water. On the cost sharing concept - I think that the corporations that carry out "industrial farm" operations should pay to have their immediate environment monitored. If 70% of our water goes to irrigation perhaps a user pay scheme needs to be derived. Who is actually benefitting from these resources and how are they paying for them? How would the water use area graph look like if it were done on a per capita basis?
- Alberta's water strategy should focus on: conservation, watershed protection and ensuring safe quality of drinking water. Environmental implications should always take seniority over industrial needs.

Environmental protection is more important than industrial growth to me. Industries that focus on investing in conservation technologies should be rewarded. Responsible landowners should also be rewarded for wise use. The major threats to our water are agriculture (consumption and quality) and industry (consumption and quality).

- The costs of not having a strategy are incalculable.
- Mandate dual flush 3L/6L toilets.
- If possible, I would like to be involved in this process in an active way. I recently studied a master's degree in water resources management in Holland. I have some ideas and I want to learn more in this big issue. What I can bring is a global vision which is very important to address this problem. I studied in an international institute that deals with water issues. This is my business card for reference.
- There are solutions out there but it sometimes requires compromise. There is a big future for reuse of water, not all industrial, agriculture or even domestic water needs to be drinking water quality. The government doesn't have to do everything it just needs to show leadership and make some tough decisions when necessary. There is nothing wrong with mandating changes - it was successfully done for unleaded fuel, it can be done for water.
- I think to find a balance in water usage you first need a starting point. When is the balance between human and wildlife consumption going to be developed. An incentive program to help Albertans understand water conservation starting in elementary education to adult life. Most of the problems with our water are caused by human intervention being residents, industrial or government. We need to develop a plan allowing the economic growth as well as conservation based on the future. We also need to address the issue of drinking water. Currently water softeners are adding sodium, reverse osmosis wastes 75% of the water and the waste from these products are reintroduced into the environment.
- Informing and educating decision makers and the general public is a major requirement to ensure any goals, objectives and strategies that are developed and implemented are properly achieved/met. Without major public education initiatives, any attempts at water management will be difficult to successfully implement. Recognize interconnection between surface and groundwater plus what we take out plus put into these resources. Cumulative impacts of development and water allocation, permits, licenses has to be assessed.
- 1. Ban man-made lakes built by housing and recreational property developers, especially when the water to fill these lakes must come from rivers, other water basins, or municipal water systems. Storm water collection is one thing, but using fresh water that's suitable for drinking to fill up a lake that basically serves as a huge evaporation pond is unacceptable. 2. Restrict the size and quantity of feedlots. The Provincial Government claims that the province can handle up to 12 million hogs (in addition to cattle). This quantity of hogs is far too large especially when considering the amount of waste produced and the issues around the safe disposal of that waste. 3. Require ALL feedlot operators to compost their manure before spreading it on the land. 4. Do NOT even consider transferring water from the north to the south of the province. The boreal forest regions, while seemingly awash in water, do experience drought-like conditions when rain and snow are scarce. The water in the northern lakes, streams and rivers is already under threat from the oil and gas industry, heavy oil operations, pulp and paper mills. River and lake levels are low at times in the north which threatens bird, animal and aquatic life. 5. A province-wide ban of pesticide and herbicide use by private property owners, municipalities, etc. should be imposed. Limit the use of these chemicals within the agricultural sector and encourage more environmentally friendly methods of weed and pest control. 6. Limit the subdivision of farm and ranch lands. More acreages mean more water wells that need to be drilled. 7. There was a note in the information package about the economic benefits of wetlands and selling peat moss for yards and gardens. Peat moss should stay in the wetlands where it belongs and serves a purpose. 8. Population size in this province and within certain areas of the province should be capped. Economic growth which encourages population growth cannot be placed ahead of environmental protection. Population growth and economic growth are tied together but we cannot continue to push for this type of growth at the expense or risk of a clean environment and fresh water for future generations. 9. Do not treat water as a commodity and simply sell it to the highest bidder as has been suggested by some politicians. If water is on the "auction block", how do you prevent people or organizations from outside the province or the country from purchasing water? If we don't have enough water to meet our own needs and those needs of future generations, we cannot open the door to bulk water sales across borders that would be subject to NAFTA rules and regulations.
- Should government spend money to make irrigation more efficient.

- Perhaps there is no place for extreme population growth. This may be a sign that we need to slow down our human footprint.
- I applaud the government for finally taking a strong direction on this issue that is probably one of the most critical ones we face. It is critical to consider both economic and ecological considerations very closely, however, the importance of the water cycle being intrinsically linked with the ecosystem must be at the forefront of consideration of options because there won't be an economic development at all if there is no water.
- Improve monitoring of diversion license. Improve wastewater/storm water management and quality. If quality is improved, treatment for potable use will become less expensive and easier.
- Divide the province into a number of water districts, each with a single major treatment plant, and provide a distribution system to each town, city, village and hamlet in each district. Plan for a future where private customers of municipalities can tie into the water distribution systems.
- When considering funding choices, I prefer incentives as opposed to penalties - grants and tax relief versus changes (e.g. grant or tax benefit to developer of housing for water conservation landscaping - maybe homeowners for natural landscaping versus golf lawns - encourage water conservation and control phosphate pollution). You catch more flies with honey than vinegar.
- To seek new approaches to sustain the water quantity, water quality. New techniques, models should be implemented to achieve the economic growth. Guess how much water is needed for the Albertans in the next 20 years. Also keep eye on the continuous increase in population in Alberta. Who will need more water in the next 20 years?
- I am concerned about water bottlers (e.g. Nanton) shipping water out of Alberta by the truck loads (almost but not bulk) and that they may be removing potable water from surface or aquifers that may be needed.
- I feel if we look at this issue in an adult realistic fashion all will benefit from the mutually respectful outcome of combined use and conservation.
- Water will have to be diverted from the Clearwater River into the Red Deer River so water usage can be increased in east-central and southern Alberta as this will be the only way to ensure population growth and industrial growth will be covered in the future. More water for irrigation both in east-central and southern Alberta as population increases the need for agriculture grown foods will definitely increase. This would ensure the South Saskatchewan River would also flow into Saskatchewan at the 50% level making our neighbours to the east happy. More reservoirs will have to be built to catch heavy runoffs and these waters would be primarily used for irrigation purposes. A large dam to be constructed west of Empress, Alberta on the Red Deer River to be used primarily for hydro electricity. This would produce enough electricity for southern Alberta for the future and fossil fuels can be sold. With the Kyoto agreement hanging over our heads this would answer a lot of concerns. Even without the agreement our Federal Government has signed the heavy use of fossil fuels will have to decline in the next decade.
- Set up a 1-800 number for pollution guideline infractions, such as spring run-off from cattle pens into streams and rivers. Old surveys show that lake levels all over the province are falling. See the former lake shorelines of Gull Lake or Joseph Lake for examples. This gradual diminishing has been occurring since the end of the ice age and will continue on it's own for decades to come. It is not the fault of recent (30 years) industrial activity as some would have the public believe. Water storage (dams), wise usage and conservation practices should mitigate this trend.
- If none of these elements are applied at the moment, it means that there is absolutely NO MANAGEMENT of Alberta's waters...and this is an absolute shame and proof of irresponsibility !
- Consider regional land use planning that would consider the limitations of economic development given the availability of water. For example, not to follow the mistake of Nevada or Palm Springs where high water use occurs to maintain golf course irrigation.
- Water storage is not a solution for water shortage. Preserve our forests. Regulate industry and irrigation a lot more closely.
- You must take every factor in this into consideration, no matter how trivial it may seem.
- The government seriously needs to get their priorities straight!
- I think the most important idea missed in this booklet is that Alberta and Alberta's water system is not a closed system. Our policies and management systems will affect and be affected by policies and management systems in the whole world. We cannot form Alberta's water strategies in a box we must

look outside our province our country. It is possible for Alberta to formulate a suitable strategy by just investigating Alberta's water issues but this strategy will be woefully inept.

- For a healthy, sustainable economy we must also have a healthy sustainable environment. Ecology and economy are the same concept.
- I am concerned that the questions in the workbook are often vague and that to understand my answer you would need some information about my thought process. There was limited space to comment on why I chose the answers I did. I am optimistic [and even excited] about the future opportunities for innovative water management practices and schemes that build on present experience, good will, ingenuity and helpful persuasion by the government, but I don't think the government should take on the task of trying to solve everyone's water problems and/or concerns. It is hard to make a good decision in an area where you have little experience, but the government can motivate and support basin and sub-basin planning and operating activities that make use of the "on-the-ground" expertise that is available to develop workable solutions.
- I am optimistic (perhaps rarely so) that the future is bright for water management - but it will take leadership by government, stakeholders interest groups and the public. There will be a need for technical mediation, responsive decision-making based on stakeholder involvement - good data, open access to data, good decision support tools will all help make better decisions. The underpinning of the success is the present license system - without a good baseline it is hard to move forward.
- Oil and gas seem to be the priority at the present time but, in the very near future, water will be the most important commodity. Other sources will replace oil and gas (i.e. solar and wind energy), but water is absolutely necessary to sustain a rising population. Care should be taken immediately to assure a necessary supply of pure water in the future.
- We might achieve a balance, but the introduction of the endangered species act (Federal) could put the environmental equivalent well ahead of any other.
- Increase awareness/education of surface/groundwater. Involve communities and community leaders. Set minimums and maximums - enforce.
- Important points: 1. Manage both incentives and disincentives for everyone to learn how to take responsibility for reducing water use. 2. Look at the biggest users (irrigation) and act accordingly in terms of benefits to economy (i.e. use (1) above to promote efficient use of water). While irrigated agriculture is (arguably) of value, is it of enough value in its current management at the individual level to risk a water supply to all others who have an equal claim to it? 3. Target change through education but allocate efforts at change on an equal basis to the volume of water used (i.e. if a group is using 70% of a water resource, devote 70% of your effort to making sure they're using it to sustain ably). 4. Next time around, try to use somewhat less slanted language – it is pretty obvious and in fact does not achieve the balance you think is being achieved! I live in an urban area but work exclusively with agricultural producers so have a pretty good idea what's going on in other parts of the province.
- The concept of sustainability is easy to define but difficult to interpret. The interpretation should take time into consideration. The lifetime of humans and other life forms is an important factor. Under sustainability, populations can grow but decline can also be contemplated. A sustainable system would see human population matched with resource availability as time progresses.
- Practically all of our water in Alberta is not potable without some treatment. Therefore we don't need to determine how much more substance it, or rather we, can tolerate. All that is left is better and more treatment and more quantity. Therefore more storage and certainly better sewage treatment - I consider agriculture run-off and storm drains in urban areas as sewage.
- The rain in Alberta falls mainly elsewhere.
- I found that the wording of many of these questions were misleading and that my answers could be taken in the opposite context to what I was meaning. I feel the conservation of our resources is the most important aspect in maintaining our water supply and planning for the future. I believe that the aquatic ecosystem should not be jeopardized based on the notion that Albertans need more water. If Albertans were to conserve their water resources and use the water effectively the impact on the aquatic environment may be minimal. Any practice that could urge Albertans to use water resources more wisely should be used. Incentives for better water use practices would be great, but education is the key. There is no doubt in my mind that water quantity is going to be the limiting factor in economic growth and population growth in Alberta and the world. Water quantity issues directly affect water quality and health

related issues. For this reason conservation of water is of absolute importance. In addition, Alberta and the world should recognize that climatic change is going to affect water supply further and that we are going to have to adapt our ways to not only conserve our water but to minimize our impact on climatic change. I feel that this initiative is a great initial step toward understanding water issues in Alberta but that the strategy must go far beyond this survey and that the public should be consulted more than once on these issues. I feel that there could have been a greater effort put into public outreach and awareness in regards to the water strategy.

- Environments change; they are not static. Opting for sustainability or, clean and plentiful water involves a conscious decision to direct an environmental variable toward an end that may/may not be "natural." Increased numbers of humans and animals produce an increased pathogen load and new dynamic within the environment. Current water monitoring in city and in particular, within rural areas, does not reliably indicate whether viable, infectious pathogens (bacteria, viruses) are present in the water. Denial of these data will lead to crises events. Failure to recognize complexities of the system compromises our ability to engineer water and sewage treatment systems and to recognize health problems within the community.
- Carefully supervise and monitor commercial companies to protect our water supply, especially clean drinking water. Also monitor them so that they do not waste or pollute water.
- Comparing "maintaining" ecosystems versus human use requires a clear understanding of what "maintaining" means (quantitative/qualitative) and how humans corporately "use" water (e.g. drinking versus aesthetics versus recreation versus convenience, etc.).
- Alberta is a semi-desert and was never meant to support the amount of agriculture and urban growth. There needs to be a recognition that growth should be limited or that what we currently have needs to be maintained, not increased. Profits should be reinvested into maintaining quality of life (i.e. finding more economical use of water, finding biodegradable products, education of water "need" and use and education of long-term effect of water use industry man-made dams, irrigation). Questions on healthy ecosystems seem to be asked as an after thought.
- I believe the economy and private sector companies are the main culprits of water degradation. If we do not have good water nothing will survive and certainly not private industry. Water must be protected from its origin and for Alberta that is the Eastern Slopes. Get the oil companies and cows out of the forest reserves.
- The public should be given a chance to ask just as many questions as were asked in this questionnaire. These questions are all controlled. Every Alberta citizen has a right to ask questions on water use etc. (should be given that right). Every Alberta citizen has a right to water (just like they have the right to breathe air). Water has to be made more valuable (like oil). Only in Canada do we have to realize something is valuable only when it's almost gone (i.e. East Coast Fisheries were all over- fished). Should never have been led into a position like that. You don't bake bread when you need it right now, you bake it in advance. Planning - very important. This province should never have been in a water shortage, predicament. Someone was not doing their job. We, southerners in Alberta have to create more water storage reservoirs (not 2.3 million acre feet capacity). We need 30 million acre feet capacity like Saudi Arabia. Water will have to be diverted from where water is plentiful (up north) Inter basis transfer is possible. Remember the Mayan Civilization. Ideas to generate funds from many sources: 1. Lotteries, casinos, gaming, slot machines, 2. Environmental tax to everyone, big users, city folk, feedlot industry, cattle, hogs, poultry, water users (irrigators etc.). 3. Create a form of garbage or recycling tax (help reduce amount of garbage going to landfills). If recyclable product is thrown out with garbage persons responsible should be fined (or taxed). 4. When making this as an opportunity to make more power generation (use sale of power to help pay for project). Farmers (too much capital gain, exemption - take 100,000 for project (e.g. Calgary and any other town/city). All water used has to be metered (you just can't use all you want). This includes irrigation farmers and industry. When flood irrigating, sometimes the water does not go where you want it too. So you make it go where you want it (or need it). Inter-basin transfer laws have to be changed. Who says you can't do it (e.g. Ty Lund) 2 years ago.
- It seems that we are trying to force future direction. I think the big challenge is to have the proper tools in place to let the people determine what happens with the water. Tools include transfers, license priorities, etc. As more water needs arise, we will find out we are quite clever and we will expand both socially and economically with the same amount of water, while ensuring environmental sustainability. We don't have a choice. The big thing is to keep the decision making and incentive with the user.

- The human race has been using water for non drinking purposes for many years. The results have been both positive and negative. With the present Canadian climate of conspicuous consumption and short-term planning the chance of growth in negative results seems great. The policy of first do not harm should be used to stop many doubtful proposals (if in doubt - don't). There is a need to respect water. We need to reduce consumption and pollution as a feature of society. Governments have a responsibility to all Albertans in this matter.
- There is a limit to how much human activity any km of Alberta can tolerate to maintain it's long-term health. We must teach each other about these limits. This teaching process will be the basis of provincial and national pride.
- This creates a temptation to move to pre-buffalo days - humans still need jobs to sustain themselves and to create wealth to fund these projects (balance).
- Past licenses should be honoured. If water is needed above what is available it could be "purchased" from existing licenses. Cities should secure water for future growth this way like U.S. cities did.
- The whole question of water and life would be a valuable field to apply Holistic Resource Management principles. They have been useful in a lot of situations (not all agricultural) and are expanding quickly.
- I am appalled at some of the questions with regards to the importance of protecting the aquatic environment - they reflect a type of thinking that has not been prevalent in our society for decades! How much more public input does the government require in order to respect the limits of the environment in the development of this province. The Water Management Committee that toured the province when developing the Water Act recommended protection of the aquatic environment, the provincial policy on Sustainable Development recognizes the importance of sustaining our environment - the only people who don't apparently is Alberta Environment. What is required is integrated land-use planning that recognizes that there are natural limits to human development as they relate to the environment, whether they be air, land or water. It is totally misleading to say that we will be "missing opportunities for economic growth" by preserving our environment. An opportunity cannot be missed if it does not exist, and one cannot exist if the water resource does not exist. We need to develop our economy in a manner that sustains our environment, that is what will be sustainable for the long-term, not short-term extraction activities. To do this will require knowing how much water is required to sustain the aquatic environment - if we don't know now, use the precautionary principle and reserve extra for the short-term, until studies are complete. Once the water is allocated, you can't (or won't) get it back. In southern Alberta, the irrigation industry uses over 90% of the water, there is no more water available for it. In allocating so much water to irrigation, the provincial government has reduced the opportunity for further diversification of the economy in southern Alberta. Everyone seems to understand this except Alberta Agriculture. Any further growth in the economy is going to occur from value-added processing, services, manufacturing, etc. Some of them will require water for their processes, the human population will require water as we grow, so increases in irrigation efficiency should not result in expanded irrigation acreage, but be used to restore the aquatic environment where over-allocation has already occurred, or be used for growth other than irrigation. To sum up: 1. Use proactive land-use planning that does not allow development in flood plains (no expensive flood damage costs or even more expensive and damaging flood protection schemes); 2. Ensure that development is properly regulated to prevent water pollution to maintain our aquatic systems and minimize treatment costs; 3. Recognize the limits of our water supply and only consider structural water management solutions as a last resort - structures cost money to build and maintain and tend to encourage poor water use and management practices; and 4. Spend resources on getting information on our water supplies and the aquatic environment so that informed decisions can be made. Finally, potable water should no longer be allowed to be used to extract oil and gas, that is removing a renewable resource from the hydrologic cycle and making it non-renewable.
- Don't we have maximum levels for stream flows foreign material already. People will figure out great efficiencies if there is an incentive.
- Also need to look at reassigning existing uses (e.g. buy water from Saskatchewan (appointment) buy water from TransAlta storage). Water engineers should "brainstorm" major works options. Look at all significant possibilities (i.e. diversions from north to south, look at all potential reservoir sites, most of these have been identified). Need to spend more money on IFN science. It needs to be accurate. Need to look at impacts of lower amounts than IFN rate on environment.
- Water has to be made more valuable (like oil). Only in Canada do we realize something is valuable when it's almost gone (i.e. east coast fisheries. Planning is very important. This province should never have

been in a water shortage predicament (south). Someone was not doing their job! In southern Alberta we have to create more water storage reservoirs (not 2.3 million acre feet capacity, we need 30 million acre feet capacity like Saudi Arabia). Water will have to be diverted from where water is plentiful (up north). Inter-basin transfer is possible. Ideas to generate funds from many sources: 1. Lotteries, casinos, gaming, slot machines. 2. Environmental tax to everyone, big users (city folk, feed lot industry, cattle, hogs, poultry water users, irrigators, etc. Oil companies use a lot of water. 3. Create a form of garbage or recycling tax (help reduce amount of garbage going to landfills). If recyclable product is thrown out with garbage, persons responsible should be fined (or taxed). 4. When making this water diversion project, use this as an opportunity to make more power generation (use sale of power to help pay for project). Farmers (too much capital gain exemption - take 100,000 for project). Calgary and any other town/city: all water has to be metered (you just can't use all that you want). This includes irrigation farmers and industry. When flood irrigating, sometimes the water does not go where you want it to - make it go where you want or need it. Inter-basin transfer laws have to be changed. Who says you can't do it? (i.e. Ty Lund two years ago).

- If we abuse environment, we cannot have an economy. Water is not a commodity to export to U.S. Industry needs to be more responsible for water use. Putting water into oil wells is lost. Need to develop an alternative to this.
- Cheap food production requires the use of fertilizer, weed sprays, high volume confinement of cattle, hogs, etc. Are people willing to pay for less production along with less pollution?
- From this evening workshop, Government to consider and put to task: investigation required, knowledge to determine, implementation. Best quote from group: "Put your inlet at your outlet."
- Human beings cannot live without water. Neither can wildlife. However some industrial or commercial ventures use a lot of water but the products which they produce are not at all necessary for the survival of species on this planet. We must be selective and intelligent when it comes to allowing use of our most important resource - water.
- More workshops for people to become more aware. More TV advertisements to save the environment.
- We have promoted development provincially and municipally without a good water allocation and quality standard in place. We have boasted about our standards of effluent treatment as the best when no effluent should be discharged into rivers unless it is either treated to remove all toxins and nutrients or used on forage irrigation where practiced. Our treatment standards have for too long been based on using our streams to assimilate our pollution. Our free water policy has led us into this poor standard of conservation and waste, now it will be costly to remedy without seriously curtailing growth particularly in the livestock and irrigation sectors of central and southern Alberta. We should also use our hydro dams on a sustained power grid instead of demand power system. Stable flows are essential to production fisheries, some 300 miles of prime rivers are nearly devoid of fish due to the peak power strategy of TransAlta.
- This will be a very large and involved process. Water management will be crucial to support and maintain current and future economical and social growth in Alberta. Imperative that public receive and have access to water situation. The more informed the public becomes, the better understanding they have and the sooner they can become proactive in their conservation of water. Infrastructure for future needs to be addressed today. Building water reservoirs, dams, etc. will leave a legacy for future generations and help to ensure a safe and suitable water supply. The government already has an extensive amount of information on groundwater from Water Well Drillers Reports submitted by licensed contractors. Perhaps the government should hire someone to correlate this information prior to spending money on further groundwater research or exploration.
- Depending on groundwater to supply demand leads to aquifer depletion and salinization of wells. As demand generally outstrips the ability of the aquifer to recharge, it is not a sustainable alternative. Let's not make the same mistakes as our neighbours to the south. Water diversion from one watershed to another will lead to deterioration of both. This is an expensive, short-term solution which should not be seriously considered in light of the fact that we have not even looked at most of the alternatives. I do have positive solutions to this situation.
- I don't believe we need power plants that require huge amounts of water when we could develop coal power plants that are clean to the environment. The plant uses huge amounts of water that goes into the atmosphere in form of steam which can cause undue damage to environment over time so people cannot even live in the vicinity. All oil drilling is changing the water aquifers in the ground polluting some

streams with H2 and in some case can be explosive. The water quality in the ground has changed considerably because of oil and gas exploration in the last number of years and seems to get worse.

- The Department of Agriculture employees must be properly trained, not just assume an "expertise" because "they" are the minions of industrial farm owners. Environment must be given the same clout as Agriculture.
- Don't sell water out of province. Education of people as to the importance of the water they take for granted. Most people in the urban areas don't know about water concerns. They turn on their taps. Water management is important.
- Support watershed groups with funding.
- When Ralph Klein was Minister of Environment with his "round table," I suggested a change in building code so that new dwellings would have a laundry tub for sudsaver washing machines. It would save some water. Nothing was done. Aren't our forests an indirect part of the aquatic ecosystems? Logging seems to continue at a fast pace. From what I've heard, there isn't much effort by our provincial government to inspect water wells, sewage systems and waste disposal.
- Determining appropriate placement of enterprises that use water is also key. To encourage conservation and establishing water supplies, grants/loans thru PFRA, recycling incentives programs are necessary. If price set on water, the sad part is those that can pay (e.g. oil and gas industry) get what they need whereas agricultural enterprises that may be unable to pay are doomed, if a cost to water usage is enforced. Limiting size of any enterprise, agriculture or industrial, is also an option (e.g. 10 small farms may draw from 10 different aquifers, whereas one large one draws from one aquifer where others may be drawing from). The total amount drawn is perhaps the same, however location of where they draw from is different and affects the overall picture.
- As many Albertans should be informed/trained in water management, watersheds. Rural forms (small, big) and corporations should be held responsible for any "residual" activity, pollution, wastes incurred by their operations. There should be laws (and enforced) which protect rivers and lakes and other water sources from the above. The oil exploration needs to become less invasive with regard to their use of people's drinking water and the latest cost of wells due to the pumping of water to harvest the oil. Water source, sustainability, ownership should remain within the municipal/provincial jurisdiction and these governments should have the integrity and responsibility to assure that outside "influences" and economics do not dictate or jeopardize this valuable resource.
- Considering you are developing a strategy to use for decades, insufficient notice was provided for meetings and insufficient time was provided for feedback. Follow the precautionary principle and stop issuing new "allocations" in basins that may run short of water in the next 25 years. Start charging for water to encourage wise use. Use watershed groups as an approach to change practices, educate, improve monitoring and clean up existing pollution. Stop allowing old fashioned septic systems in areas where they cause groundwater contamination and require new technology or systems that will protect water quality. Stop allowing the oil and gas industry to inject surface and potable groundwater for oil and gas recovery. Make the industry use non-potable water sources. No more dams. Reduce agricultural use.
- Protecting the quality of the existing water, whether surface or ground must be the highest priority. In southern Alberta all rivers, streams and coulees are overused by livestock to the point that water quality is suffering. The "first in time" and "use it or lose it" methods of allocation must be replaced with the most efficient use. The amount of irrigation water on any given piece of land must be regulated to prevent waste. Irrigation districts must be encouraged to get on board with conservation, up to this point their conservation drive has been to licence more acres with the same amount of water. Environment should be monitoring the operation of districts more closely. Finally there is a great deal if expertise in the water management fields in southern Alberta, both private and government. This is where we should be looking for Alberta-made solutions to the current and future water problems. Good luck.
- Without industry and agriculture, this province will suffer. Treat the spring freshette as a renewable resource and store the water wherever possible.
- All questions regarding IFN are very subjective and may vary due to influences not completely regulated by science. It may have more to do with the opinions and biases of the regulators.
- People are part of the environment and have both a positive and negative ecological impact. I believe people need to have that all important priority use of water above the aquatic environment. Industrial and

agricultural use of water can be and must be sustainable, environmentally and economically. I believe we can have both by planning now. My fear in a forum such as this is that peoples responses are skewed by some self proclaimed "experts" who obviously do not know what they talk about. Maybe priority uses of water needs to happen (e.g. food production over recreation). I'm very disappointed in this forum as no one corrected the untrue outlandish statements being made.

- Missing whole range of options to encourage sustainable water use in industries and households.
- It is important when implementing changes, to do this in a way to encourage everyone to comply, as opposed to doing this through strict rules and regulations. In Europe, farmers have to keep to very strict regulations regarding manure and have a pile of paperwork to complete (e.g. when spreading manure). That is very discouraging to producers and not the way to do it. Instead, farmers should be given guidelines, but have options of how to best comply on their farm.
- It is extremely important to conserve our water. The aquatic environment should be maintained at a high level. In some instances excessive industrial and human uses of water will damage the very important aquatic environment. People waste a tremendous amount of water in their daily lives. Water meters should be mandatory in all cities and towns.
- Metered water use in municipal districts. Ranches, farms, acreages anyone pulling from rivers or wells. Reassess grandfathered users and have assertiveness to take back water licenses or meter and charge.
- Make water meters mandatory in all cities, towns and villages. Possibly consider meters on irrigation systems. Tax water used from rivers and wells on Government property. In times of drought human use in towns, villages etc., must have priority over any license holders regardless of seniority. A priority list should be made up and strictly adhered to in times of drought. I suggest (a) human use (dwellings, towns, cities and villages); (b) livestock watering (to include hauling water from rivers); (c) agricultural irrigation projects (this should not include golf courses and other recreational use or aesthetic lakes in developments which are filled from rivers); (d) Industrial use (each project should be judged on its own merits); (e) recreational water use and aesthetic lakes should be at the lowest priority regardless of license seniority; (f) pumping huge quantities of water down oil wells should be disallowed. This water is permanently lost for the future and could pollute water aquifers. Oil companies should find some other ways (e.g. nitrogen or an inert gas) to replace water injection in oil recovery. Water may become a very valuable resource. It is essential to all forms of life. It should not be sold or leased to the highest bidder. Everyone is entitled to enough water for his/her personal use for living regardless of it's effect on senior water licenses held downstream for less important uses. If water licenses are not being used for the purpose for which they were originally issued they should be cut back or cancelled. If senior licenses (with no restrictions) are a problem to the Government, they should be bought back or changed by government.
- A sustainable environment is a must for a sustainable economy. Our province must plan carefully. Wetland loss will mean decreased amounts of groundwater. The water strategy must address the importance of wetlands to groundwater. Wetlands provide many benefits to citizens in Alberta. The water strategy should address the issues of recognizing private landowners for the provision of those benefits on their land. Those who alter the hydrological pattern should share in the responsibility for the resulting impacts.
- Canadians have to look to the government for support and look into the beliefs that we need to take care of Canadians before the rest of the world. Canadians should be our first priority and we should look to solving our problems with water as a national issue. I'm not saying leave the rest of the world to itself, but we need to find sustainable resources and take care of Canada before the rest of the world.
- I am among those who will be watching closely to see the impact of the new legislation for licensing intensive livestock operations (I forget the new ???). Their small benefit to the economic situation of Albertans as a whole is not worth the negative impacts on lifestyle of humans or animals.
- Industrial use of water should be more closely monitored. Injection of potable water for the use in the petrochemical industry should be investigated. Water should not become a trading commodity (e.g. I agree with water transfers, but at a set fee). I agree with inter-basin transfer, but only by pipeline and as the last resort after all conservation methods are explored. At present, there is too much waste of water by people in general.
- Things haven't changed much since I read 'Our Precarious Habitat' by Mervine A. Bernarde (1970). When looking at the water picture, we must look beyond the short-term and economics. We must look at the cost of not having water and cleaning up a mess. Western Canada is generally drier than eastern

Canada, this is a given. We must work with what we have. Education is mandatory. Too many western people waste this valuable resource and assume endless supply. They reject conservation and blame problems on environmentalists. Most wells in my area contain no-potable water due to energy sector contamination in the past. The private sector and economics have not brought prosperity, but rather bad water. The government is the only body that can do it right. It must be done right.

- Maintaining aquatic environments that protect ecosystems in times of drought may be difficult. There must be an understanding that nature has it's own way of dealing with adverse weather conditions. In times of drought - normal averages for stream levels must be adjusted down in extraordinary circumstances.
- The whole process seems to be aimed directly at providing more water to the ecosystem. Too many of the questions are (leading) slanted in that direction. The economic impacts are very important - that is what gives us the high standard of living we enjoy.
- Irrigation districts were over-represented. Rural people - people which live many miles from any irrigation district or river system were not that well represented. Simple survival of these very rural areas depends on vast pipeline systems which will become a life line to our communities.
- A full and complete plan for all of North America should be in place. Transfer and control of all fresh water to be the goal. I feel that North America has the industry and economy to do this within 100 years.
- I would like to see a much closer monitoring of how much water is accessed for concentrated intensive farms (hogs, chickens, etc.) In areas where they are drawing from springs and wells - such as the impact of Hutterite colonies on local water supplies.
- I have a lot of trouble with our water when environment lowers Waterton Dam too much. The aquifer we draw from depends on the dam for it's water. I feel consulting the people involved directly is very beneficial. Then you have an idea of the concerns and ideas of people who the decisions directly affect.
- We need to make the best use of water and treat it with TLC.
- Minimum necessary uses need to be established. If you go over or abuse the amount of water you use you should pay. Also, priorities need to be established even if we argue over what they are. Government needs to invest in water and water storage. If costs are downloaded to municipalities, businesses and individuals we will never develop decent storage and management because no one will be able to afford it.
- Water must not be taken for granted. Putting a price on water will conserve water (e.g. water might be worth $5/gallon for drinking and people will gladly pay for it. But what is it worth for growing wheat? By putting a value (price) on water will conserve water.
- In southeastern Alberta, I find it astounding that there is such reckless use of water and such strong resistance to end-user consumption controls, yet this is such a day area here (Brooks area). I regularly find myself listening to acrimonious remarks directed at the village because of implementation of water meters here in 1993. In the 21st century, I find this huge vacuum of public knowledge on matters of water conservation to be unacceptable and there needs not only to be more public education, but more government funding for implementation of end-user controls on all water conveyance infrastructure.
- There are many ways demands on our water supply can be reduced through better management and limiting industrial and agricultural use. This needs to be front and centre in any water strategy. Also more needs to be done to prevent pollution and contamination by agricultural users. Alberta Environment needs to start doing its job and protecting Alberta's existing water supply instead of giving it all away.
- Build more storage.
- As Alberta moves forward water quality and quantity will become more and more important. I feel that wetlands are very important to the quality of water and should be protected. Also we need more water storage facilities such as dams, especially in southern Alberta.
- We have to realize that some of our streams exist now as a year round stream because of man's intervention with water storage facilities.
- Inter-basin transfers: a bad idea. Watershed/ecosystem sustainability, that is their protection and conservation comes as a first priority. This is the number one measure of quality of life in Alberta, not economic growth. Growth shouldn't be the government's top priority. It has reached the limit in southern Alberta. Let's not cause a hundred more problems.
- Government must not become too involved in management decisions on rural farms and ranches. They must have informational sessions to teach but not be involved to the point where they dictate. Is the

Alberta Government considering exporting water to the US? Have we studied other countries on how they have addressed water problems? What about parks and recreation will lakes be allowed to go dry?

- Selling private groundwater is totally unacceptable. Efficiency is the way to go. IF we had the money that PFRA gave out for building dugouts we could have pipelined the whole country for livestock water. You must know where you are and where you are going as a basis (this includes the environment, domestic and industry). Water should be free but the way you use the water must be monitored with an eye of efficiency (pumping ?? should be born by user (this is a stock water situation). Inter-basin transfer has to be looked at now to know the ramifications and cost/benefit. Meeting was poorly advertised for such an important topic.
- In our area water is critical to survival and in a prolonged drought we need water from somewhere. If we do not use our water allocation from current rivers and other sources, someone else will and we will not have any industry, municipalities or ecosystems left in this part of Alberta.
- People who live in towns and cities do not need to shower two times a day. Lawns do not need as much water as they are given. Car wash service centres use too much water. Pulp paper mills and malt plants should find ways to recycle more water.
- The concept of treating all domestic water to the current high drinking water standards, when clearly only about 5 to 7% of the water is actually used for drinking and cooking purposes, needs to be reviewed, especially for small systems. Also if the concept of "FITFIR" is replaced or modified, there must be compensation for those who have built infrastructure, or derive their livelihood, based on that right.
- This government has yet to satisfy needs on the reserve on the Old Man River. Municipalities have an obligation not to develop endless subdivisions when the water supply is not ensured. Economic growth often creates problems that the general population is left to solve (i.e. costs are often not worth it except to a few).
- For much of this, no new surveys and studies are needed. There are many reports and studies already sitting on shelves. Use them. Do not waste more money reinventing the wheel. Government, oil companies, drilling companies, environmental groups and naturalist groups all have studies.
- It is human nature to wastewater if it is free - the same as the abuse of our medicare.
- The gradual decline of quality of water in the Red Deer River due to upstream activities, e.g. agriculture, acreage development (sewage), etc.
- The cost of providing potable water to Red Deer citizens: cost of water and increased cost of treatment.
- Reduction of holding capacity of the Red Deer River's head waters due to logging - rapid run-off instead of slow steady run-off.
- Subtle messages are now being put forth by municipalities. The City of Calgary cut off outside watering in October to work on facilities. It was considered an annoyance to those who take water for granted. We pay more for natural gas and oil as commodities. Water needs to become a commodity not to be taken for granted as an unending supply but a valuable resource with a price tag. Many rural areas have signs that say water is not suitable for drinking. If the costs of providing potable water to everyone were diverted to a potable/non-potable system, it would reduce purification plant costs.
- Politics and rhetoric cannot change biology and nature. Alberta cannot survive for future generations without air, food and water. Nothing can survive without clean water. Consumerism is an insane way to live: to use up all the essential elements to life as quickly as possible. When the oil and gas are gone, how will Alberta sustain itself? Governments must stop working on behalf of the private sector. It's time they started protecting the citizens they serve! Ratify Kyoto. Protect people.
- Water resources will limit the amount of economic growth and industrial growth in this province. Without water conservation, we will be in trouble in the future.
- Make composting mandatory on all intensive livestock operations in Alberta. Benefits: reduction in greenhouse gases, ground/surface water protection, perfect soil enhancement for Alberta crops (that are desperately low on top soil). Stop using pesticides - they kill everything. Consider environmental impact over economic when dealing with water license allocations. Without our natural ecosystems intact and functioning, Alberta will have no economy.
- Establish/update studies on availability of water. Establish present basic use: 2.1 essential (incl. Households); 2.2 industrial/commercial/farming; 2.3 recreational. Implement measures to preserve and recycle water. Sale of unused portion of water licenses open to abuse. The authority of rural authorities remains unchecked. For major developments, such as a golf course, all assessments are left to the MD

Development Department and MD Council. All submissions are done by courtesy copy only to the government agencies that may be affected and should exercise their policing role. It should be mandatory for all parties to have an onsite meeting. Vigilance must not be left to the less informed public. Rural MDs are overwhelmed with applications to change land use designations from "Agricultural" to "Country Residential." If there is an overall plan with regard to sustained development, also with regard to wildlife corridors, ecosystems and water resources, it is not apparent in our present piece meal approach.

- Lately all I hear about is charging for water. Is this the only answer government has for conserving water? Looks like an easy tax grab to me. Who developed the private water supplies (dugouts, springs, dams, wells), the government? As an irrigation farmer and water user, I cannot afford any more taxes or service charges. Agricultural communities are price takers, not setters, we cannot pass increases on. Industrial users of water will pass increases on to the public. Industry and population that can be located where there is more water - northern Alberta - and should be encouraged to locate there through incentives to reduce the demand on water in the south. You cannot grow specialty crops on every acre of irrigation. If we have to pay for all our water, we may as well close our doors as our margins are small enough as it is.
- Large dams like the Oldman and Waterton have destroyed important aquatic ecosystems leaving two somewhat sterile bodies of water that have limited aquatic quality not to mention recreational value (wind and other climatic conditions). We need to take inventory and decide how much industry and population our province can sustain without jeopardizing our quality of life too much. We can learn from history as well as the present to make the right decisions.
- We need to limit our population growth at some point in time. We only have so much fresh water. Quality of life is important. Scarcity of water and contamination is already a concern in this province.
- Have City of Edmonton treat to a high standard all their sewage that goes into the river like any small municipality has to. One rate for all.
- In southern Alberta the government allows provincial grazing reserves to flood irrigate many pastures. The excess water (in many cases more than the useable portion) is allowed to drain back into the closest river basin following the path of least resistance. Our local ecology is being destroyed by the massive slumping of coulees and the silting of our rivers. This practice must stop as it is very short sighted. I have notified government officials of this serious situation, but the practice continues.

did not indicate location

- We revere our rivers and desecrate our streams.
- Seismic - prefer thumper instead of drilling - worried about draining surface water.
- Water is very important to everyone in Alberta, it needs to be protected.
- What limits if any should be placed on direct and indirect profit-taking from water resources? What population strategies need to be developed in parallel with strategies for water management? Is it too late to limit the exponential growth of profit taking based on water resources?
- I am a Lethbridge householder. I have not watered my grass this last year. I have rain barrels and I have weeping hose along the rows of my vegetable garden, which have reduced my water use by about 30% the last 2 years. However, I have 10 trees which shelter my garden. I can move the hose from one to another. I can't carry buckets of water though. If I had a simple hand operated pump, with garden hose attachments, I could pump grey water from sinks, bathtubs, etc. out to trees and shrubs. I don't use herbicides or pesticides at all. I think we should stop cosmetic use of them right away in household gardens.
- It is imperative that biological assessments are carried out in receiving water bodies and not just chemical monitoring. The aquatic community (fish, insects, etc.) are the true indicators as to whether the river or lake is healthy. Determine what are the primary, secondary, tertiary uses of the river are before determining what the water quality targets for the river are.
- Watersheds should be a basic planning unit. We can use nature rather than engineering solutions.
- We must consider the changing nature of natural demands on the water cycle - climate change is going to reduce the amount of water that is available for human use. Determining limits of sustainability today will have to be repeated in the future because today's limits will not apply in the future.
- We may not at present have absolute proof that we must conserve resources, but isn't it a reasonable and ethical thing to start doing?

- Our water should never by exported to the U.S. There is too great a need for it in our own province.
- I think that the essential nature of water (to human life) should be recognized if we plan to commodify and set a price on the basic resource, then we should provide a base level for drinking/washing for free or at a lower price.
- Questions are leading e.g. 12.3. Some substances should never be discharged into the river in the first place - so if you disagree with question it sounds like you don't care about what goes into the river - so of course you agree. But then putting chemicals (and other waste) into rivers is not acceptable.
- I don't believe inter-basin transfer of water is wise. It would be extremely costly and do great damage to the total environment.
- Licensees received licenses at very little cost. If they are no longer using water, it should revert to crown with no cost to crown - use it or lose it - should not create profit for licensees.
- Would be very upset if we were charged for water for the following reasons: It costs us money to drill wells. We were told there would not be a cost for water, that the Water Act does not provide any clause allowing for a charge for water, and if a charge is enforced we were lied to when registering our wells.
- We still got water to make beer and wine. Get a job make water processor so we can support foreign pig farms. No need to complain, we got no ears. Rate payer of Alberta.
- Private water systems are a right. It is a resource that I as an Albertan already own. Any move to charge me for what I already own, really would piss me off. Any information you get back on usage will be inaccurate if people see it as a money grab.
- Need more knowledge but common sense required should not abuse the system, don't need a study to tell you this, look at regional solution percentages based on nine basins.
- Put water meters in every home in Calgary and make them accountable for the water they use (i.e. you use it, you pay for it). Agricultural use of water (irrigation) needs closer to scrutiny. Small savings of water on a large scale agricultural operation means big savings in water that could be used elsewhere. The province cannot afford to ensure that every rural dweller has safe water (e.g. a well). This would bankrupt the province. Province could perhaps assist in other ways.
- Updating power systems to be of lower impact in each particular region.
- I have trouble accepting that the amount of water can be determined e.g. the aquatic environment to remain healthy. There are so many variables that come into play. I consider it a waste of time and money to determine water quantities in natural environments. Let the natural ecosystems be.
- Industrial use of water should be stringently controlled. There are other "liquid alternatives" that can be used other than water. For example filling up old oil and gas well sites.
- 1a. What are you referring to? Climate change? How else can water become increasing scarce? 1b. Agree because the government will reduce its regulation of drinking water until a Walkerton happens. 1c. Agree because the government will continue it's political, non-scientific, uneconomic allocation of water. 1d. Too bad the government has its head(s) in the sand and has not figured how much climate change will affect our water supply. 1f. Disagree because the government might actually be managing for other needs besides irrigation. 1g. What would you expect from a government which cannot or is afraid to regulate people's activities? 1h. Agree because the government is afraid to properly regulate existing flood plain development. 1i. Too bad knowledge is not important to decision makers now! This is an extremely badly designed questionnaire. it seems like it was designed by a public relations firm rather than a qualified social scientist. The issues are highly selective and appear to be based on a very limited knowledge of water issues. The questions are in most cases poorly constructed - either motherhood or open to multiple interpretations.
- I found these questions slightly vague in some areas and biased in others. This is a very sensitive subject that will influence our health in the short-term and our very survival in the long-term. Please make your decisions with caution and care.
- The format of the survey is set up is such a way that someone in a rush or wants to make themselves feel like they are doing everyone a favour including the environment. They will agree with what the questionnaire suggests. Common sense should override an environmental agenda. I agree with conservation and good management only if it makes sense. Crazy ideas like closing water use for fish is not practical nor intelligent.
- I believe the government is on the right track. However, being involved with a small municipality, I recognize the need for the province and perhaps the federal government to contribute to the

sustainability of small communities through partnerships with them to ensure we provide quality drinking water. As well, continue to educate the general public to responsibly use the water (both drinking and recreation). I do not believe "regulation" is the answer, this will not give ownership to the users of the water. Note: Alberta is a leader in this country for water quality and treatment regulations. Source protection.

- An informed decision will be more effective. With knowledge we can manage our water systems to avoid a lot of infrastructure and diversion. The knowledge is a base for planning. Consider these as preventative steps. This is less expensive than repertory measures.
- The diversion of water from one river basin to another, is only a short-term solution. This will eventually cause many problems for the ecosystem. The talk of diversion is Mr. Taylor's way of making his people happy in Medicine Hat. He should really be focusing on water quality and quantity issues. It angers me to see the government put out this 'water for life' program and the Minister's talk on TV about how much the government is doing for the water quality issues, because in fact the government is only providing less than $200,000 for analytical costs for water samples, while Saskatchewan is getting over $800,000. This just tells me that the government really is wasting money somewhere, and again the real issue (water quality) is not being looked at.
- We must all learn about water, where it comes from and how to protect it. Water should not become an economic commodity that provides income for sellers (i.e. surplus from a licensee's needs). Educate and ensure adequate knowledge is available to users. Pollution must be discouraged by penalty actions. Costs of rehabilitating aquatic systems must be borne by the person who degraded the aquatic system (i.e. cattle must be kept from permanent and part time creeks). Walkerton could have been avoided if manure wasn't in the watershed to start with.
- I do water well systems for rural people and small towns. I know the present government does not like to be involved with business and I would prefer that as well, but we have water problems in rural Alberta. At the present time, the provincial government pays 75% of the cost for water projects for small towns and that is only if they hire a water consultant company to run the project. Having no one on staff with water knowledge, these small towns are being badly abused by these people. I feel the government is wasting so many dollars on small towns, it would pay to have provincial hired staff to oversee every project in Alberta. If your government decides to sell out our rural areas, as a trade off to get urban green votes, then you leave us with only one option; a militant one and that's your choice.
- Rivers should be allowed to run their course. . . we can borrow from them, but have responsibility to keep them clean and healthy and plentiful, too. And then information can be shared with neighbouring provinces to get them practicing the same. People have to understand that rivers are the "lifeblood" of the earth. Let's keep them clean.
- As with other issues we have faced, when we reach an environmental constraint in Alberta, we need to develop a better understanding of the issue and change our behaviour to address the situation in a forward looking, common sense way. Why don't we develop the 5Rs equivalent of water use: re-think, reduce, re-use, recycle and recover? Alberta should be strategically incorporating more global learning about industrial ecology, life cycle analysis, triple bottom line accounting and sustainable design into the way we manage our business and resource use, including water. There should also be more research about the effect that individual water "treatment" processes have on health. Positive health impacts of chlorination, and other treatments, are well known, but it is not clear that long-term exposures are as well understood. Long-term exposures to other contaminants that enter the water including pesticides, herbicides, other chemicals and drugs should be more closely examined. Prevention of contamination, overuse and destruction of ecology and ecological services is crucial.
- This workbook fails to consider that healthy aquatic environments often require excess water through occasional flooding or high water levels. Rather than capturing or transferring every so-called "extra" drop of water so that it can be used by humans, some mention should be made to allowing the natural benefits of flooding to promote a healthy environment. Another concern deals with the idea of "value pricing" water. It occurs to me that companies could easily promote their product or service as providing good value for their water requirements through job creation and high value products. These same companies have the ability then to recover their water costs through increased prices. People like farmers may not have the same ability, and may be shut out of the water allocation process.
- This is a very biased questionnaire toward the answers government wants for privatization, diversion, etc. Are you paying any attention to comments such as given here? If you look only at numbers, you are not

conveying the full intent of responses. If lake/river levels have dropped below environmentally sustainable levels already, allocation should be out (i.e. be very conservative setting limits, particularly taking global warming/climate change into account). Large dams/diversions do not make total economic or environmental sense in the long-term - forget them. Groundwater withdrawal (e.g. oil/gas industry) takes water out of the system, therefore not sustainable. Water not a renewable resource. Industry/agriculture should pay toward their large share of water (i.e. increase costs with increased use to promote conservation. Why must we provide more irrigation use when it is the heaviest user - think more dry land management. What are on allocations as percent of total available (minus Saskatchewan allocating). If we are near 100% of that available, we should not be expanding use. Environmental protection does not necessarily near loss of economic development - just think differently. Big is not necessarily better and profit is not drinkable.

- I believe that we as Albertans have to take time and think before we act. Pipelines with diversions are not the answer. Monitoring wells, pollution testing (air, water, soil) equipment should be in place; therefore we as citizens are protected far into the future and for generations to come. Protect our water and air. Limit industry and agriculture to a slow growth. Do not allow dollars to come first. People are of first concern. Let's not destroy our environment.

water for life

results from completed workbooks
other submissions

Sub-report No. 1
section d

May 2002

The following submissions include additional comments or other information submitted with workbooks or handed in at community workshops, as well as submissions forwarded to Equus Consulting Group Inc. or Alberta Environment (mail, email or handed in).

1.	Joan Dyrholm	Gleniffer Lake
2.	Ron Pearson	Edmonton
3.	Ray and Fay Jones	Duffield
4.	Barry Northey	
5.	Dorene A. Rew	Red Deer
6.	Dave Westgate	Calgary
7.	T. Punko	Fort McMurray
8.	Al Taylor	Calgary
9.	Barbara Botros	Calgary
10.	Tom Maccagno	Lac La Biche
11.	Florence and Raymond Knight	Calgary
12.	Richard Clark	Medicine Hat
13.	Denice Stewart	
14.	Marilyn Unger	Cochrane
15.	Dr. June Donaldson	Calgary
16.	Dr. Dan Stevelman	
17.	Thomas Vladut	
18.	County of Grande Prairie #1	
19.	Clearwater County	
20.	Red Deer Chamber of Commerce	
21.	Health Canada	
22.	Ducks Unlimited	
23.	City of Edmonton	
24.	Federation of Alberta Naturalists	
25.	Bow River Basin Council	
26.	Eastern Irrigation District	
27.	EPCOR	
28.	AAMD&C	
29.	M.D. of Rocky View No. 44	
30.	Northern Alberta Development Council	
31.	Red Deer County	
32.	Wildrose Agricultural Producers - Discussion Paper on Water Quality, Quantity and Export (November, 2001)	
33.	A Discussion About Climate Change	
34.	Canadian Ground Water Association - Guidelines for Sanitizing a Water Well - If you Require a Water Well - Fact Sheet #1 - The Cost of Ground Water - Fact Sheet #2 - The Quality of Ground Water - Fact Sheet #3 - Ground Water Contamination and Protection - Fact Sheet #4 - Guidelines for Sanitizing a Water Well	
35.	Help Fight the Industrialization of Agriculture! Help Fight Factory Farms in Alberta	
36.	History, Current Legislation, Water Basin Knowledge, Diversions, Water pricing, Future Economic Development	
37.	Comments on Workbook	
38.	Additional Comments on Water for Life Survey - Underlying Assumptions	

1. Joan Dyrholm Gleniffer Lake

April 12/02

Equus Consulting Group:

Re: Water for Life: Alberta's Strategy

Enclosed is my submission for the above Study. Although my case is a specific one, it deals with, I believe, shortfalls in Environment & Counties approval process.

There needs to be change in this process and I need and request help with the problems that have arisen from this process.

I would be available for a presentation to show the complete "story".

© MARJOLEIN BASTIN

Joan E. Dy

(403) 288-7122

Water For Life: Alberta's Strategy for Sustainability
Radisson Hotel Calgary-- March 12, 2001

Submission for the public forum:

My name is Joan Dyrholm. I am a landowner of farm and forest land that has been in the family since 1904. I own farm land situated directly NE of the Gleniffer Lake Resort and Country Club which is located on the north shore of the Dickson Dam (Gleniffer Lake). This dam is located on the Red Deer River, 20 minutes west of Innisfail. **(Enclosure "A": aerial view of the resort)**

Issues that I believe need to be addressed are:

1) A Co-ordinator/Committee appointed above the A.E.P. level to look at the entire development picture.

- There is no one authority overlooking development in Alberta. A.E.P. is very compartmentalized, so when decisions are made by Municipalities and the Environment each department does not take into account the effect of other departments' decisions.
- There seems to be no safeguards to prevent cumulative effects of piecemeal development.
  The Problem of piecemeal development is - one planning authority approves subject to Environment's approval. Neither party sees the whole picture or the cumulative effect of several staged developments.

The problems I am having are the cumulative result of staged development. A golf course and a 800 lot year-round R.V. and mobile home park has been approved at the Gleniffer Lake Resort. Presently less than half of the lots are constructed and sold. It has been piecemealed from 96 lots to the proposed 800 lots. Man-made ponds have been expanded from the proposed four to eight. **(Enclosure "B": Conceptual plan with 4 man-made ponds, submitted at time of approval for B.L.C. designation. Actual plan constructed: showing 8 man made ponds.)**

These 8 ponds have a capacity of holding 96 acre-feet of water. (*Translation: 96 acres of land with water one foot deep over the entire area.)* The development consists of 212 acres which formerly was farm land that dried out in between rains, now with effluent irrigation, the land (golf course) is kept artificially wet, so when there is a substantial rain the major run-off is directed onto my land. One pond contains the effluent from the Resort's Sewage Treatment plant, while the other seven are used to contain the run-off from the effluent irrigated golf course. I believe none of these are lined in a manner to prevent contaminates seeping into the groundwater. **(Enclosure"C": picture of effluent pond showing its sides crumbling.)** The area is sandy soil with a high water table of about 7 feet from the surface. The ponds are deep and I believe extend into the groundwater table. Seepage from these ponds could cause long term contamination of the groundwater. Neighbouring landowners rely on the groundwater as their source of drinking water.

(2) Need For an Impact Study of development on the Dickson Dam, and on the Groundwater, both of which are a source of drinking water:

- The Dickson Dam is raised and lowered by Dam authorities. This charges and drains the aquifer. **(Enclosure "D": Steve Clare's report.)** Thus in the discharge stage the Dam will be draining potentially contaminated groundwater from the effluent of the Resort's inhabitants which is stored in seemingly unlined ponds and irrigated on to a piece of land which, according to Robert Kennedy's information, is only capable of handling the sewage from a development ¼ this size.

- The resort has increased from 96 lots for summertime use to over 800 lots for year round usage. According to licensing, the effluent cannot be disposed of by irrigation onto the golf course when the ground is frozen. The effluent builds up in the effluent pond in the winter time. The levels in the pond by the end of the winter is high. My concerns here are:

A) The capacity of the effluent pond for winter storage does not appear to be adequate for the purposed number of inhabitants.

B) What impact does the pressure of this water storage and it's contents have on the groundwater level and groundwater quality.

  a) Giardia (Beaver Fever), Cryptosporidium & Entamoeba are some of the effluent waterborne pathogens not destroyed in sewage treatment plants. (Also viruses.)

  b) The Resort has to chlorinate the effluent pond if the coliform count is to high, and when chlorine combines with fecal matter a known carcinogen is formed.

  c) The effects of medications that are excreted by humans is also an environmental concern. Research on this is now being conducted. Pharmaceutical Companies are mainly concerned with the impact of what goes into a human, they have done little research on the environmental impact of what is excreted.

  d) The development's use of pesticides, herbicides, fungicides, fertilizers and their impact on the groundwater and the Dam water are also issues for an Environmentally advancing province to address. Mercurial Fungicide usage was allowed on Golf Courses until the mid 90's. The Calgary Valley Ridge course had to have the top 12" of top soil scrapped off due to mercurial contamination. Today's chemicals can be tomorrow's contaminants.

3) An Alternative - Hauling Sewage away and/or irrigating more land.

- Carefree Resort (~400 lots) haul their sewage away.

- Robert Kennedy's information would indicate that a section of land is required to support the sewage of 3000 people. Even taking into account the partial year use, it would seem that RDFC's 42 acres of effluent irrigation will not handle the effluent without eventually contaminating the groundwater.

4) Manner in which Alberta Environment and/or Developers advertise and notify adjacent landowners of impeding development.

- Appears to me to be a 'Cat and Mouse Game.'

Our land was going to be negatively impacted for future building and wells and the Developer was only required to notify us 30 days prior to commencing effluent irrigation. **(Enclosure "E": Licensing requirement for Sewage Treatment Plant.)**

I now subscribe to three newspapers in order to keep abreast of the Resort's latest proposals.

- *Adjacent landowners need to be notified by registered mail prior to approvals and development.*

5) Storm water run-off / Water Management Plans need to be required by the Developer at the Planning Stages.

The Gleniffer Lake Resort was not required to provide a storm water management plan at the planing stage.

The Developer had a plan, not intended for Storm water Management, which he submitted after the golf course development was mainly completed. Although this plan was drawn in July '97 it was not submitted to A.E.P until Dec. 1998 when he applied for a Water Diversion Licence. **(Enclosure "F": Overland Water Diversion & Gibson plan** - Note the off-site drainage to Dyrholm land.) In my search of documents obtained through F.O.I.P.P. this was the first time off-site drainage was shown. Yet the water and sewer treatment plants were up and running in the late summer of 1998.

I believe the Developer did not submit it to Governing bodies because it showed off-site drainage to Dyrholm private land to the north. This would have reminded officials of perhaps a need for Pre- and Post Development Water Flow Studies. These should have been required by a development of this magnitude.

Gleniffer Lake Resort, without License from A.E.P., are using my property for excess Storm water run-off, although having no permission from us. Alberta Environment were very aware of the issues as well as the damages caused to our property, *(this included agricultural, forest land, basement flooding and house foundation undermining*) but they have not taken adequate steps to protect my property, aquifer, and present and future wells. Perhaps A.E.P. will now be more willing to deal with this situation due to the recent problems that have arisen at Lake Chestermere with sludge contamination of the lake, thought to have come from Calgary's Storm water flows. **(Enclosure "G": Newspaper clipping.)**

6) Concerns by members of Council and my concerns were never addressed.

From the Resort's files obtained from F.O.I.P.P. I see questions were raised as to the large magnitude of this development and impact on neighbouring lands. Government officials had concerns, asked questions, but these questions were never addressed. **(Enclosure "H": Interdepartmental Memos)**

7) Adjacent landowners should not be required by A.E.P to have to seek the Resort's permission to build because the developer's sewage treatment plant encroaches on their land.

My husband and I wish to build on our land. Due to new A.E.P. setbacks, which have increased the required distances of wells and houses from effluent ponds and mechanical sewage systems since my husband gave permission to allow the effluent pond and irrigation to remain as constructed, we now have to obtain the developer's permission to allow us to develop.

8) Conclusion

It is my hope that this 'Study' will have a broad scope so as to be able to deal with the 'entire picture.' In the past three years I have made numerous presentations to Government bodies, regarding environmental issues of this Resort Development. I have felt my issues have fallen upon polite ears with no potential action. *Continual upgrading of environmental awareness is showing that my concerns are indeed justified and require action.*

I believe other similar resorts are capped at about 400 lots. I do not believe that a developer's financial benefit from maximizing the density of his development should take precedence over human safety and potential environmental pollution.

I believe that government officials have been reluctant to address these issues because general approval has already been granted by them.

9) Pertinent information about RDFC (The Gleniffer Lake Resort)

RDFC a company mainly owned by Keith Westergaard lent money to the Tri-West companies. The Westergaard's, who managed and are the owners of the Tri-West companies, neglected to pay their company (RDFC) which gave them reason to foreclose on the Tri-West companies and in the process eliminate a $6,000,000.00 mortgage, much of which was held by senior's from British Columbia. **(Enclosure "I")**

I have enclosed Court documents to show the Resort is under Creditor Protection due to financial difficulties. **(Enclosure "J")**

The developer is under siege from private investors who have already lost 6.5 million and stand to lose 1.8 million if they are not secured under the proposed restructuring plan. The developer is currently suing the Engineering firm and golf course architect. **(Enclosure "K")**

The developer had listed the Resort for sale. **(Enclosure "L")**

I am pointing these issues out because it is not too late for the Government to make the Resort address these issues in the light of new environmental awareness, before the Developer goes off over the horizon leaving Albertans with costly Environmental issues.

Thank-you for your time and consideration of the issues that I have raised.

Respectfully submitted,

Joan Dyrholm.

Joan Dyrholm

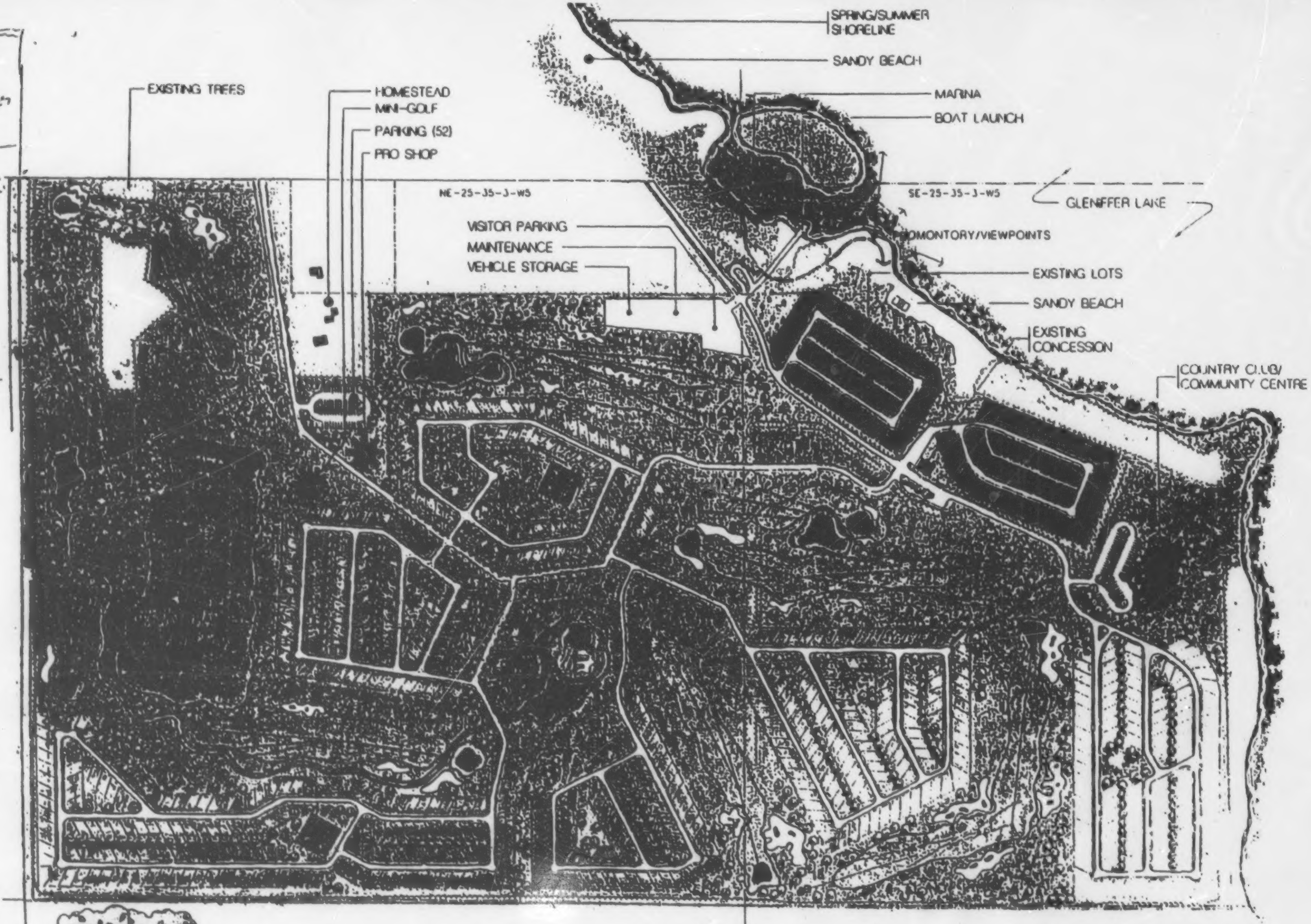
(403) 288-7122
Fax (403) 288-7165

A

B

MS
2.43
Acres

MS
4 ACRES


SPRING/SUMMER SHORELINE
SANDY BEACH
MARINA
BOAT LAUNCH
EXISTING TREES
HOMESTEAD
MINI-GOLF
PARKING (52)
PRO SHOP
NE-25-35-3-W5
SE-25-35-3-W5
GLENIFFER LAKE
VISITOR PARKING
MAINTENANCE
VEHICLE STORAGE
PROMONTORY/VIEWPOINTS
EXISTING LOTS
SANDY BEACH
EXISTING CONCESSION
COUNTRY CLUB/ COMMUNITY CENTRE

TriWest Resorts Ltd.
(403) 728-3010
SPRUCE VIEW, ALBERTA

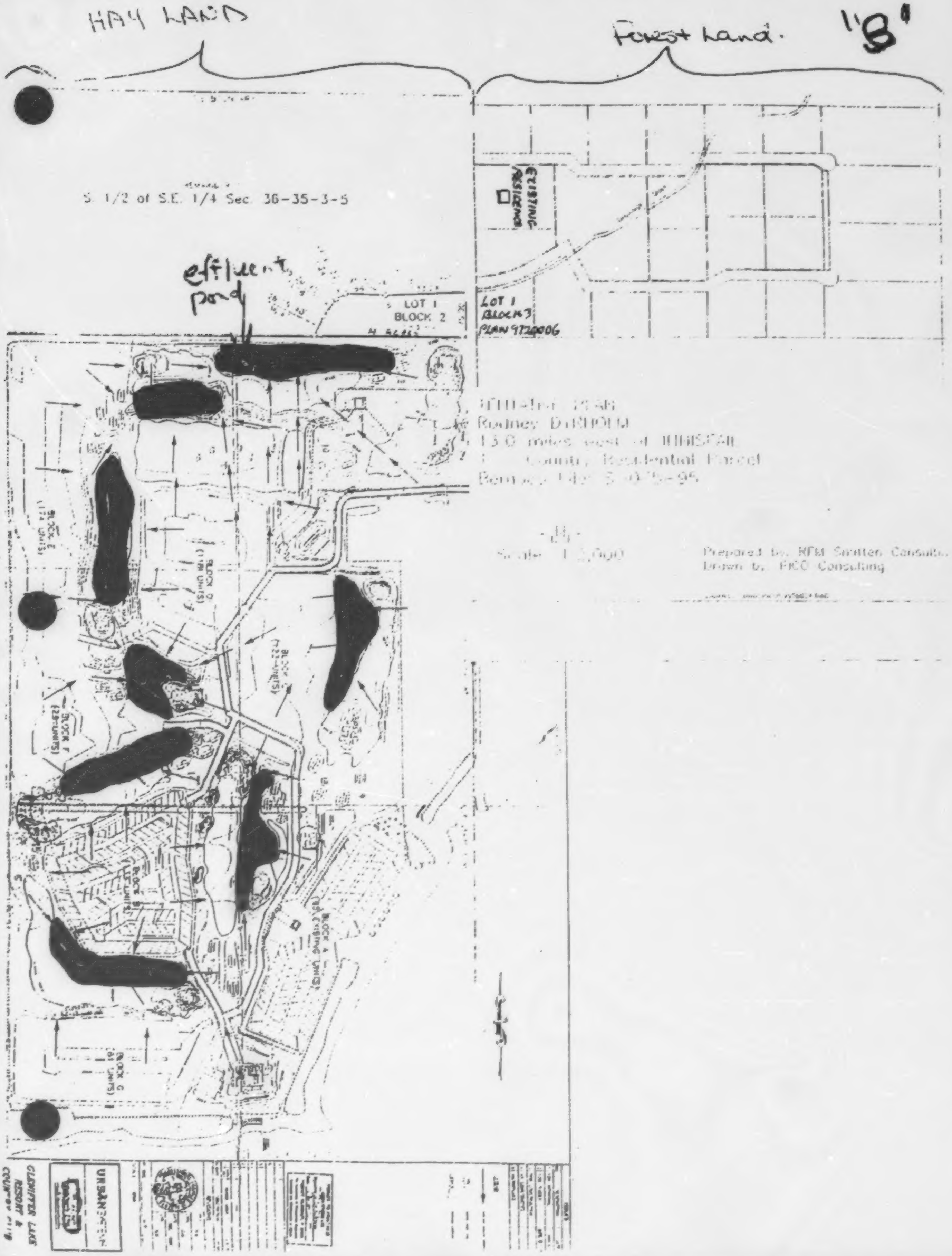
CONCEPTUAL DEVELOPMENT PLAN

0 50 100 150 200
SCALE IN METERS

B

Earlier Plan 1993?

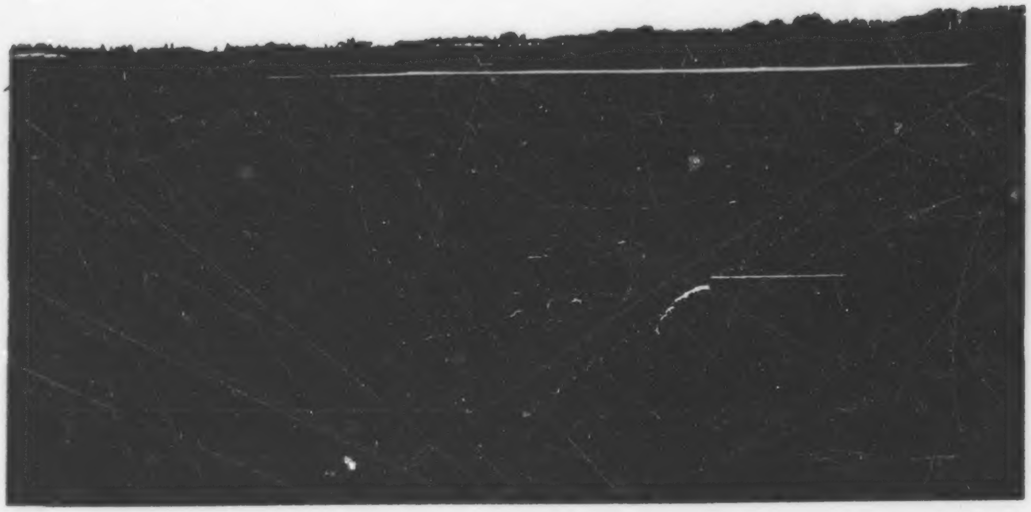
"B"


HAY LAND
Forest Land.
S. 1/2 of S.E. 1/4 Sec. 36-35-3-5
EXISTING RESIDENCE
effluent pond
LOT 1
BLOCK 2
4 ACRES
LOT 1
BLOCK 3
PLAN 9720006
Rodney
miles west of
County, Residential Parcel
Scale 1:5,000
Prepared by RFM
Drawn by
Consulting
BLOCK E (173 UNITS)
BLOCK D (118 UNITS)
BLOCK C (122 UNITS)
BLOCK F (29 UNITS)
BLOCK B (125 UNITS)
BLOCK A (16 EXISTING UNITS)
BLOCK G (61 UNITS)
GLENIFFER LAKE RESORT & COUNTRY CLUB

"C"

TRI-WEST EFFLUENT POND "F."

Just Prior to the Heavy summer rain of 1999. Note the sand seepage +low water level



Effluent POND "F", AFTER HEAVY RAIN EARLY SUMMER 99.
Note distant pond over flowing to Pond "F"

No response "D"

Alberta
ENVIRONMENT

Memorandum

FROM Kenn Looten, P.Eng.
Manager
Regional Support Branch
Parkland Region - Red Deer

OUR REFERENCE

TO Nga-de-la-Cruz
Head, Hydrology Branch
Water Sciences

DATE March 10, 2000

TELEPHONE 340-7660
FAX 340-7662

SUBJECT **GROUNDWATER LEVELS NORTH OF THE DICKSON DAM RESERVOIR**

We have been advised by the owner of a resident on Section 31-35-2-W5M that he is experiencing basement flooding. Alberta Environment has an observation well (No. 4031R) within a half mile of the residence that shows that the sand and gravel in the area is being charged by the Dickson Dam Reservoir.

When the reservoir is high, the water table in the observation well is close to what we believe is the basement elevation of the residence. We are conducting a survey of the ground and basement elevation of the house to confirm levels.

Would it be possible to have your staff review the data and provide an opinion as to whether the combination of surcharging the aquifer by the reservoir and rainfall could be causing the basement-flooding problem.

We have discussed this issue with Steve Clare and will provide him the survey data once it is available.

Kenn Looten, P.Eng.

cc: Jim Martin
Peter Pui
Dan Hubbard
Frank Cardinal

- gives no data
or geography of
[illegible]
- [illegible]
[illegible]
- collection point, seepage
[illegible] of [illegible]

Time line

"D"

Post-it® Fax Note	Date SEPT 12	Pages 10
To JOAN DYRHOLM	From DAVE COOPER	
Co./Dept.	Co. HYDROCONSULT	
Phone #	Phone #	
Fax # 288-7165	Fax #	

Alberta
ENVIRONMENT

NATURAL RESOURCE SERVICES
PARKLAND REGIONAL SUPPORT BRANCH
DICKSON DAM
BOX 6139, INNISFAIL, AB T4G 1S8
FAX: 403-227-1360

Date: July 31, 2000

TO	DEPARTMENT/COMPANY	FAX	PHONE
David Cooper	Hydro Consult	403-2[illegible]-9818	

FROM Jim Martin PHONE 403-227-1106

CC Peter Stevens, Kenn Looten

SENDER (if different from above) PHONE

RE Observation Well 4031

____Urgent ____As Requested ____FYI ____Please Action/Reply ____Please Distribute

# OF PAGES INCLUDING COVER PAGE 9 If you did not receive all the pages please notify sender

NOTES/COMMENTS:

Attached is some documentation and information that may assist you in your analysis of the water problem on section 31-35-2-W5M.
Attached is:
- A location plan showing our observation wells 4031 and 4031R
- A analysis by Steve Clare of the hydrogeology department pertaining to ground water in the area
- A copy of a E-mail from our survey supervision giving relevant elevations
- Copy of reservoir regulation records

Note: one graph may not fax to well, call if you need it and cannot read it.

If you need more information, please give me a call at 227-1106

The attached material is intended for the use of the individual or institution to which this facsimile copy is addressed and may not be distributed, copied or disclosed to other unauthorized persons. The material may contain confidential or personal information which may be subject to provisions of the Freedom of Information and Protection of Privacy Act. If you receive this transmission in error please notify the sender immediately by phone at the above return phone number. Thank you for your cooperation and assistance.

"D"

Groundwater Levels North of the Dickson Dam Reservoir With Respect to a Basement Flooding at 31-035-02W5M

The groundwater hydrographs of the observation wells have been examined and compared to the reservoir levels and to the local precipitation patterns measured at the Dickson Dam weather station. A cross section shows the positioning of the reservoir with respect to the house, aquifer and monitoring well.

From the plot of the reservoir levels the reservoir fluctuates from about 939.2 to 947.8m above mean sea level. The levels are lowest throughout the spring and early summer, and increase peaking in fall and early winter.

Hi-Rate Drilling Ltd. installed observation Well 4031 for Klohn Leonoff Consultants Ltd. as a monitoring piezometer in 1977. The well was completed in the uppermost portion of a sand and gravel aquifer known as the Dickson Gravel and Sand. The 38mm diameter well had a slotted portion from 11.6 to 12.2m below ground surface. The aquifer is from 11.6 to 18.9m. The shallower material consisted silt with interbedded sand stringers. This well was replaced on November 2, 1993 with well 4031R, which is a larger diameter (141mm) well that could house an automatic chart recorder with float system. The well has a stainless steel well screen from 15.6 to 17.1m. There have been problems acquiring continuous data from the well chart recorder. One chart from the well has not been located, the chart recorder has had problems with the float hanging up on casing joints, and there have been problems with the recorder clock stopping.

The driller report shows till immediately above the sand and gravel aquifer with silt and clay above that. Therefore, the water in the aquifer would be confined to within the sand and gravel. The water level is a measured "pressure" in that aquifer, not to be confused with a water table level in the shallower silt and sand layers. There are no water table monitoring wells in this area.

The groundwater level in this aquifer immediately increased when the reservoir was initially filled in 1983. The aquifer has responded directly to the reservoir level fluctuations since the initial filling, which is evident on the attached graphs. Prior to the reservoir filling the aquifer was only partially saturated with water. As the aquifer was filled, the air within the Dickson Gravel and Sand aquifer was vented out from the monitoring well 4031 casing.

To determine how a shallow water table aquifer at this site would fluctuate, a residual mass curve was constructed with the precipitation data collected from the Dickson Dam weather station. This curve shows the cumulative differences between short-term aggregate values and the long-term aggregate. Where there is a decrease from one point to the next, that indicates a period of lower than average values for the period. Conversely, an increase from one point to the next indicates above average values for the period. The generated graph is based on a weekly mean for the period

"B"

02/05/1983 to 01/03/2000. This curve is a very useful tool in predicting the ground water levels in a shallow water table aquifer. The curve increased significantly during early July 1999 as a result of the above average precipitation received in the area. It is expected that the groundwater table at this site would have resambled this curve peaking within a few days after the precipitation event.

Other periods that may have been problems with a high water table would have been in the summers of 1983, 1986, 1990, 1991, 1994, 1995, and ? — 1998.

Two other graphs of daily precipitation have also been constructed to show the significance of the July 1999 rainfall event. These two graphs are daily totals of rainfall.

Conclusion

The basement flooding appears to be related to local precipitation events increasing the shallow water table rather than seepage from the dam. This is based on the following:

- The bottom of the basement (949.78m) is at a higher elevation than the level the reservoir reaches (947.8m) by approximately two metres. should be 94[illegible].0 SHM
- The water level in the Dickson Gravel and Sand aquifer is isolated from the shallow water table by a till unit and a silty clay layer.
- The residual mass curve shows a substantial increase as a result of the July 1999 above average rainfall event. The shallow water table in this area can increase dramatically to these precipitation events.
- The basement flooding does not occur every year. If it were influenced by the reservoir it should be flooding each year.
- If the problem were caused by seepage from the reservoir then the basement would experience flooding problems starting in August through to the end of December when the reservoir is at its highest levels.
- The water table on the north side of the reservoir has been historically high. Ditches were constructed long before the reservoir was built to drain the land for agricultural purposes.

Recommendation

1. The installation of a shallow water table monitoring well at the 4031R site would show how this aquifer responds to the climatic variables. It would be useful to compare the fluctuations between the two different aquifers. The depth of completion would be about 5m. ✓

Stephen Clare, C.E.T.
Hydrogeology Section
Water Sciences Branch
Water Management Division
Alberta Environment
July 26, 2000
File 5CB. 2000-070

Alberta 'E'
ENVIRONMENTAL PROTECTION

APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
S.A. 1992, c.E-13.3 and as amended from time to time.

APPROVAL NO. 19061-00-00

APPLICATION NO. 001-19061

EFFECTIVE DATE July 2, 1998

EXPIRY DATE July 2, 2008

APPROVAL HOLDER Tri-West Resorts Development Corp.
Attn: Randy Westergaard

Pursuant to Part 2, Division 2, of the Environmental Protection and Enhancement Act, S.A. 1992, c.E-13.3, as amended from time to time, approval is granted to the approval holder subject to the attached terms and conditions for the following activity:

Construction and Operation of a Class II wastewater treatment plant and a wastewater collection system for Tri-West Resorts Development Corp.

Date Signed July 2, 1998

Director's Signature

"E"

(b) a SBR (sequencing batch reactor) wastewater treatment plant and includes all of the following:

- (i) wedge wire screen;
- (ii) aerated basin/clarifier;
- (iii) treated wastewater storage pond;
- (iv) provision for disinfection;

(c) treated wastewater discharging via irrigation located in the E ½, Sec 25, Tp 35, Rg 3, W5M;

(d) sludge treatment which includes the following;

- (i) aerobic sludge digesters;

4.1.2 The approval holder is only authorized to receive wastewater from Tri-West Resorts Development.

Storm Drainage

4.1.3 There are no underground storm drainage collection systems.

Snow Storage Sites

4.1.4 There are no approved snow storage sites identified.

SECTION 4.2: CERTIFIED OPERATOR

4.2.1 The day to day operation of the wastewater treatment plant and the wastewater collection system shall be directly supervised by a certified operator who holds a certificate valid Level II (or higher) Wastewater Treatment Operator Certificate.

SECTION 4.3: SLUDGE HANDLING

4.3.1 The approval holder shall dispose of sludge by hauling to an Approved facility or as otherwise authorized in writing by the Director.

SECTION 4.4: CHEMICALS USED

4.4.1 The approval holder shall not use any chemicals in the wastewater treatment process except as provided in this approval or as otherwise authorized in writing by the Director.

4.4.2 The approval holder shall only use the following chemicals in the wastewater treatment process:

"E"

TERMS, CONDITIONS AND REQUIREMENTS ATTACHED TO APPROVAL

(a) Chlorine for disinfection if required.

SECTION 4.5: IRRIGATION

4.5.1 The approval holder shall not dispose of treated wastewater by way of irrigation except as provided in this approval or as otherwise authorized in writing by the Director.

4.5.2 The approval holder shall use treated wastewater from the treated wastewater storage pond for irrigation of lands only if all of the following conditions are satisfied:

(a) 30 meters of land separates all treated wastewater irrigated land from other adjacent properties except when adjacent property owners give written permission to reduce this distance;

(b) 100 meters of land separates all treated wastewater irrigated lands and each of the following:

(i) lakes, streams, or rivers;

(ii) water reservoirs or watercourses; and

(iii) occupied off-site residential dwellings;

(c) landowners adjacent to the golf course have been notified that treated sewage effluent is being used to irrigate the golf course;

(d) signs have been posted in the clubhouse and around the golf course notifying golfers that treated sewage effluent is being used to irrigate the golf course;

(e) irrigation standpipes and outlets on the golf course have been marked to indicate that they are part of a wastewater irrigation system and not part of the potable water system;

(f) irrigation shall NOT take place when the golf course is open to public and for two hours prior to opening to public.

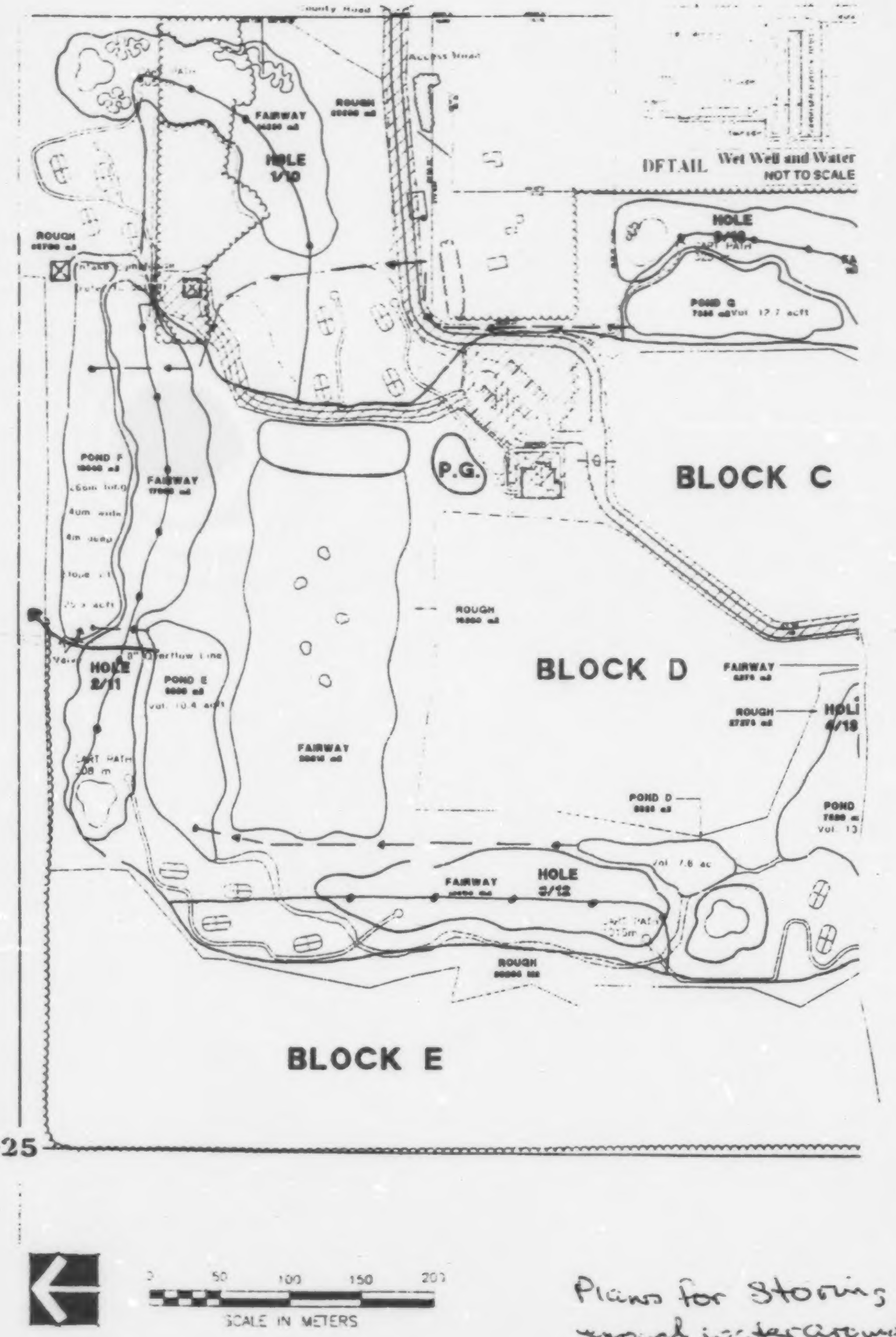
4.5.3 The treated wastewater irrigation application rate shall not exceed the capacity of the soil to absorb moisture, and there shall not be any runoff from the irrigation site.

4.5.4 The approval holder shall not use treated wastewater for irrigation when any one of the following conditions exist:

(a) wind speed exceeds 30 kilometres per hour; or

(b) if the soil is frozen or snow covered.

4.5.5 There shall be no direct or potential cross-connection between the treated wastewater irrigation system and any waterworks system.


County Road
Access Road
CART PATH
ROUGH
FAIRWAY
HOLE 1/10
DETAIL Wet Well and Water
NOT TO SCALE
ROUGH
HOLE 9/18
CART PATH
POND G
Vol. 12.7 acft
POND F
FAIRWAY
P.G.
BLOCK C
ROUGH
BLOCK D
FAIRWAY
ROUGH
HOLE 4/13
HOLE 2/11
Overflow Line
POND E
Vol. 10.4 acft
FAIRWAY
CART PATH
POND D
POND
Vol. 7.6 ac
FAIRWAY
HOLE 3/12
CART PATH
ROUGH
BLOCK E
25
0
50
100
150
200
SCALE IN METERS

"F"

(403) 728-3010
SPRUCE VIEW, ALBERTA

CONSULTANTS

Randall R. Conrad & Associates

TRIWEST RESORTS DEVELOPMENT

PROJECT LOCATION

SE-25-35-3-W5

← — ← Drainage Path
Irrigation Main Lines
—●—●— Main Sprinkler Lines

REVISION/ADDITION	FIELD BOOK	DRAWN BY	DATE
CREATION		[illegible]	[illegible]

CHECKED	BY	DATE
FOR APPROVAL		
TENDER	KR	97 7 9
CONSTRUCTION		

SEAL

SEAL

PERMIT

PROJECT TITLE

GLENIFFER LAKE RESORT & C.C.
GOLF COURSE DEVELOPMENT 1997

SHEET TITLE

OVERALL SURFACE TREATMENT PLAN

SCALE 1:2000

PROJECT NO. R3403-1

CADD FILE 3403-1B

SHEET NO. LS-3

Plans for storing enough water around for golf course irrigation for one year. Not a Stormwater Management

Alberta

DEC 30 1998

APPLICATION
for LICENCE

ENVIRONMENTAL PROTECTION

Pursuant to Sec. 11(1)(a)(b)(c) WATER RESOURCES ACT 'F'

APPLICANT'S NAME: TRIWEST RESORTS DEVELOPMENT
Please type or print full name clearly

ADDRESS: BOX 81
Street, P.O. Box or R.R. No.

728-
6-3010 SPRUCEVIEW AB T0M 1V0
Phone No. City, Town or Village Province Postal Code

hereby applies for authority to construct the works shown on plans filed in connection with this application and for the right to divert 105 acre-feet of water annually from

SURFACE RUNOFF
Name of stream, lake, reservoir, aquifer or other source of supply

at a point in

	SE	25	35	3	W 5
LSD or Quarter		Section	Township	Range	Meridian
Plan No.:		Block:	Lot:	Location Coordinates:	

if available

for GOLF COURSE IRRIGATION purposes.

The lands on which the works are to built are held as follows (Check applicable boxes):

as registered owner ☑ (Registration No. ____________);

purchaser under agreement for sale ☐ ; lessee ☐ ; renter ☐ ; to be negotiated ☐ .

(If several parcels are affected by proposed works show ownership of each on an accompanying map)

Plans, supporting data and reports showing details of water requirements, construction and operating procedures accompany this application, or are to be filed on my behalf by:

Name and address of consultant, agency or other engineering services

Phone No.

I/We agree to construct works in accordance with plans filed and approved in connection with this application and to recognize the rights of other water users.

Signature(s) of applicant of signing authority

Date DEC 15 19 98

RANDY WESTERGAARD
Type or print name and title of signing authority

OTHER APPLICATION FORMS	FORWARD COMPLETED APPLICATIONS TO:
Under The Water Resources Act available on request WR 1A - Drainage - Sec. 11(1)(d) WR 1B - Permits - Sec. 11(1)(e) WR 1C - Exploration Permit - Sec. 15	ALBERTA ENVIR. PROTECTION Water Resources Admin. Division Regional Administration 304 Prov. Bldg., 4920 -51 Street RED DEER. Alberta T4N 6K8

FOR WATER RIGHTS OFFICE USE ONLY:

Advertising Required ☐ Waived ☐ ☐ File No. 80789

Priority No.	1998	12	30	02
	Year	Month	Day	Number

Recorded by:

Approved for Processing : Date Jan 7th 19 99 By

WR 1 (Feb./84)

SEE OVER FOR INFORMATION FOR APPLICANTS

"F"

INFORMATION FOR APPLICANTS

An application to divert and use water, under provisions of The Water Resources Act, consists of the completed form together with data, plans, reports and specifications in sufficient detail to permit evaluation of the effect of the proposed works on:

(a) the source of supply

(b) other water users in the vicinity

(c) other lands and works

Unless appropriate authority has been received it is a violation of The Act to construct works or to divert water.

N.B.
State all is constructed.
Do they have approval?
[illegible]

EXCERPT FROM THE WATER RESOURCES ACT

11(1) On application being made as provided in this Act and the regulations, a person may acquire, subject to any valid and subsisting rights,

(a) a licence to divert and use water for any or all of the following purposes:

(i) domestic purposes;

(ii) municipal purposes;

(iii) irrigation and other agricultural purposes;

(iv) industrial purposes;

(v) water power purposes;

(vi) other like purposes;

(b) a licence to impound water for the purpose of water management, flood control, erosion control, flow regulation, conservation, recreation or the propagation of fish or wildlife or for any like purpose;

(c) a licence to use water in its natural state for the purpose of conservation, recreation or the propagation of fish or wildlife or for any like purpose;

(d) a licence to divert water, otherwise than by impoundment or storage, for the purpose of water management, flood control, drainage, erosion control or channel re-alignment or for any like purpose;

(e) a permit

(i) to lay, place, build or erect in, over, under, on or adjacent to any water any structure, device, contrivance or thing, or any earth, sand, gravel or other material, which will interfere with or will be capable of interfering with the present or future development, conservation or management of that water, or

(ii) to remove or disturb any earth, sand, gravel or other material forming part of the bed, shore or banks of any water, where the removal or disturbance will interfere with or will be capable of interfering with the present or future development, conservation or management of water.

15(1) An applicant for a licence or permit referred to in section 11(1) shall file with the Minister an application in writing in the form and containing the particulars that the Minister may from time to time prescribe and shall set out the nature of the proposed diversion or works and the purpose thereof.

16(1) Subject to subsection (2), the Minister shall, forthwith after the filing of the application and plans, forward a notice of the filing to the office of the secretary-treasurer of the municipality in which the site of the proposed works is located, with a request that the notice be posted in a conspicuous and public place in his office for a period of 15 days from the date thereof, and the Minister shall also send 2 copies of the notice to the applicant who shall immediately post them and keep them posted for a period of 15 days from the date thereof at 2 conspicuous points at the site of the proposed works.

(2) Instead of proceeding under subsection (1), the Minister may require an applicant to publish in a newspaper published in the neighbourhood and to be named by the Minister, a notice of the filing of the application and plans.

(3) The notice referred to in subsection (2) shall be published at least once a week for 2 successive weeks, and shall contain a statement of the nature of the rights applied for and of the general character and location of the proposed works.

(4) Any person who objects to the granting of the application may, within a period of 30 days from the date of the first publication of the notice in the newspaper or the date of the posting of the notices in accordance with subsection (1), file with the Minister a statement of his reasons for objecting.

CALGARY HERALD

'6'

Lake cleanup

FRIDAY, MARCH 8, 2002

'regional issue'

Calgary effluent has city on spot for Chestermere bill

GRADY SEMMENS
CALGARY HERALD

Calgary taxpayers are being asked to pick up part of the $10.5-million bill for dredging tons of contaminated soil from the bottom of Ch[illegible]rmere Lake.

City officials say they're willing to pitch in with the cleanup but won't shoulder the blame for the pollution, even though Chestermere officials say t's "obvious" hazardous chemicals are a result of run-off from the city.

"I wouldn't be assuming any liability on behalf of the City of Calgary until we know what it means," said Calgary Mayor Dave Bronconnier. "It's a regional issue and one we have to work co-operatively on."

Chestermere Mayor Dave Mikkelsen and three town councillors met with the city's intergovernmental affairs committee Thursday to ask that the city help pay for the removal of 780,000 cubic metres of sediment that has built up in the lake over the last century.

Thursday's meeting was the latest step in Chestermere's ongoing dispute with Calgary that has seen lawsuits filed, then put on hold, as the David-and-Goliath municipalities try to sort out who is responsible for the condition of the lake built by the Canadian Pacific Railway in 1903 to serve as an iri[illegible]n pond for farmers.

It also comes amid urban-rural friction, a day after rural mayors scoffed at city staff being asked to look into the possibility of taxing rural residents who work in the city. Mikkelsen termed that idea "silly," with even city Ald. John Schmal calling it "insulting to our neighbours."

Tests by water quality experts last summer found the silt in Chestermere Lake contained higher than normal amounts of radioactive strontium and barium as well as levels of such heavy metals as arsenic and cadmium that are close to the limit considered safe for living organisms.

Mikkelsen said he's hopeful the City of Calgary will pay its fair share of the cleanup costs, pointing to city reports that say levels of cadmium, mercury and arsenic in the Bow River spike at Cochrane and Calgary while much of Chestermere Lake's water passes through Calgary's storm sewers as it works its way east.

"We're kind of sitting back like the poor cousin here," said Mikkelsen, who was careful not to mention any numbers. "If we look at it on a per capita basis, the city would have to pay the lion's share — but we have to explore all the options."

The water supply for Chestermere Lake comes from the Western Headworks Irrigation Canal, which branches off the Bow River near the Calgary Zoo, and from the 35 storm-sewer outlets that empty into the canal.

"It's a fact that we are a settling pond for Calgary's storm-sewer system," said Mikkelsen. "The connection between industrial Calgary and what is in the lake is obvious to us."

It provides the drinking water for Chestermere and seven towns downstream.

FROM B1

LAKE

City engineers estimated 62 per cent of the sediment that entered the lake last year came from city storm sewers, with the rest coming from the irrigation canal and from Nose Creek, which empties into the Bow just upstream from the canal.

They also said the city has recently built several new settling ponds for storm water and are about to cut run-off levels to Chestermere by 12 per cent with the $20-million Shepard Wetland, to be built in the southeast.

Mikkelsen was quick to point out that chemical levels in the lake fall within acceptable federal standards for drinking water and said the lake is safe for swimming except when storms in Calgary boost the bacteria count into the danger zone.

"It's not like our kids are glowing," he said. "We want to be pro-active and not wait another 20 years down the road when the lake will be horribly polluted."

City staff were told to do more research into the source of the contaminated sediment and report back to the committee in June.

[redacted]

D# 22 "H"

COUNT... ...D DEER

Dev... ...partment

Distribution Completed On:

By:

Oct 1/99 File No.: [illegible] Qtr: NE 25-35-3-5

Deb Bourett Applicant: [illegible] ...cts Lot/Blk/Pl

Spiring road co... ...SE RETURN YOUR COMMENTS BY:

...ent: for private devel.

Operations	
Date Received	
Oct 1/99	
L.H.	1/10/99
J.S.	
[redacted]	
R.S.	10/04/99
[redacted]	

...RAL:

INTERNAL:

...PERATIONS:

...or ✓

...erv

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Director

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COMMUNITY SERVICES:

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Fire Serv

Patrol

EXTERNAL:

AB Environment

AB Transportation

AB Agriculture

Other:

Council

All Council

Specific Member:

...OR YOUR:

Information

Action

Revie...

Distribu...

...proval

✓ Comments & Return

Revisions & Return

...chments Included: Spiri... ...road construction plans

NO... DETAILS:

Please review plans... determine impact if any on County operations

Debbie, Please ... both Jim & Lavernain comm... "... developer should ... ...up, on the Storm Water management out... ...the private side onto the County's re... ...ditch facilities. The development sh... ...w its retention/detenti... facilities & ensure that post development flows do not exceed the pre-development rates."

PROCESSING:

Start New DP File

Make Receipt

Order Title

Check Legal

... Zoning Map

...y Plan

... Development Agreement

...ther

COUNTY OF RED DEER NO. 23
CIRCULATION FORM

DATE: Oct 4, 1999

TO: Rob Stenhouse

DEPARTMENT: Operations

FROM: Laverne Horne

DEPARTMENT: Public Works

✓ For your information/attention only

___ For your approval/signature

___ Please investigate & report

___ Please draft reply for: ______________

___ Please reply direct

Other: Rob these plans look straight forward [illegible] [illegible] this is all on private land, and Red Deer County will not maintain. The [illegible] Elevations indicate that the water will exit to the South west in the Ditch Drainage and there for minimal impact to County Road Ditchs should Occur. I would like to Know where the final water exit is on to this whole area. Does it end up in the Red Deer County Road Ditch

"H"

B #23 "H"

COUNTY OF RED DEER NO. 23
CIRCULATION FORM

DATE: Oct. 4/99.

TO:

DEPARTMENT: Development Dept.

FROM: **Rob Stonehouse**

DEPARTMENT: Engineering Services

For your information/attention only

For your approval/signature

Please investigate & report

Please draft reply for:

Please reply direct

Other: General Comments: Boreland Condominium

County responsibility within the development

County Responsibility within development.

for service Drainage System: Any type of drainage

shall be approved by a licensed (AE)

Environment incl. erosion control.

Sewer System: The system shall meet

recommended standards of A.E. Standards

REPLY:

Guidelines for Wastewater Facilities.

System: The system shall meet the

Recommended standards of A.E. Standards

No hydrants indicated.

Buildings: County Fire dept. should

Plans re: possible fire protection

B #25
"H"

Agriculture Services

Memo

To: R. Stonehouse

From: Jim Squire

CC:

Date: October 7, 1999

Re: Tri-West Resorts Development Proposal NE 25-35-3 W5M

The drainage from the proposed development is to the west-southwest, per the elevations shown on the attached plan. The water would then enter into the pond areas on the adjacent golf course. If these ponds are sufficient to contain the water, I would have no concerns with the development proposal. Information on the size and holding capacity of these ponds are not included in the plans, so we should stipulate that the runoff from this [illegible] contained in the ponds.

(this area is to be contained)

Abbervated form

"I"

IN THE COURT OF QUEEN'S BENCH OF ALBERTA
JUDICIAL DISTRICT OF CALGARY

0001-18702

Action No: 0001-18702

JUDICIAL DISTRICT OF CALGARY
FILED
MAR 1 4 2001
Clerk of the Court

IN THE MATTER OF THE
COMPANIES' CREDITORS ARRANGEMENT ACT
R.S.C. 1985, c. C-36, as amended

AND IN THE MATTER OF THE
ALBERTA BUSINESS CORPORATIONS ACT
R.S.A. 1981, c. B-15, as amended

AND IN THE MATTER OF THE
JUDICATURE ACT
R.S.A. 1980, c. J-1, as amended

AND IN THE MATTER OF
RESORT DEVELOPMENT FUNDING CORPORATION

AND BETWEEN:

RESORT DEVELOPMENT FUNDING CORPORATION

Applicant

- and -

THE CREDITORS AND SHAREHOLDERS OF
RESORT DEVELOPMENT FUNDING CORPORATION

Respondents

AFFIDAVIT

I, **KEITH WESTERGAARD**, of Calgary, in the Province of Alberta, Businessman, **MAKE OATH AND SAY THAT**:

1. I am the President of Resort Development Funding Corporation, ("**Resort Development**") and as such have a personal knowledge of the matters hereinafter deposed

I

believe same to be true.

Resort Development Funding Corporation. Corporate Overview

2. Resort Development was incorporated on April 14, 1999 under corporate access number 208267187 and is a privately held, Calgary based Alberta corporation. The sole directors of Resort Development are myself, Nick Vanderstelt of Richmond, British Columbia and my brother, Randy Westergaard of Spruce View, Alberta.

2nd set of investors
1 8 million

3. The voting shares of Resort Development are owned as follows:

Name	# of Voting Shares
E. Ball - Vancouver, British Columbia	25
J. & D. Bazso - Langley, British Columbia	35
Charlyn Investments Ltd - White Rock, British Columbia	100
Canadian Western Trust Company - Vancouver, British Columbia	248
A. Christensen - Abbotsford, British Columbia	25
N. Davidowicz - Vancouver, British Columbia	25
H. Epp & B. Egers - Richmond, British Columbia	25
M. Francato - Surrey, British Columbia	25
A. Henricksen - Burnaby, British Columbia	25
G. Heselton - Burnaby, British Columbia	25
Kilian Enterprises Ltd - West Vancouver, British Columbia	70
D. McKellar - Vancouver, British Columbia	25
C. Richards - Calgary, Alberta	25
E. Rosenthal - Vancouver, British Columbia	30
A. Scott - Burnaby, British Columbia	25
N. & D. Vanderstelt - Richmond, British Columbia	70
R. Salomon - Salmon Arm, British Columbia	250
S.D.A. List Brokers, Inc. - Nassau, Bahamas	760

1st set
off the
Title
out of
luck!

2.5 sowp
1,080 shore,

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Laurentian Trust of Canada - Vancouver, British Columbia	40
TOTAL	1853

Now shown to me and marked **Exhibit "A"** to this my Affidavit is a true copy of a corporate search for Resort Development. The registered office for this company is located at Calgary, Alberta.

Glennifer Lake Resort and Country Club

4. Glennifer Lake Resort and Country Club ("Glennifer Lake Resort") is the sole asset of Resort Development. Glennifer Lake Resort is a year round five star recreational vehicle ("RV") resort located 1½ hours northwest of Calgary and 2 hours southwest of Edmonton, Alberta. Glennifer Lake Resort is located on Glennifer Lake. Glennifer Lake has over 22 miles of shoreline, is over 7 miles long and is up to 1.5 miles wide in certain areas and is over 130 feet deep in some locations. Glennifer Lake Resort, has in excess of 5000 feet of shoreline and is designed to incorporate 865 bareland condominium RV lots, 150 marina slips, a full size 3300 yard 9 hole golf course with pro-shop, clubhouse/community centre with indoor and outdoor pools, jacuzzi, restaurant and lounge with tennis courts all situated on approximately 217 acres. Glennifer Lake Resort has been operating since 1986. Now shown to me and marked **Exhibit "B"** to this my Affidavit is an accurate artist's rendering of the Glennifer Lake Resort including its

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From Page (4)

6. Tri-West Resorts Ltd ("Tri-West") was incorporated on May 23, 1986 as a privately held, Innisfail based Alberta corporation. The directors and shareholders of Tri-West were (Keith) myself, Garry Westergaard of Sherwood Park, Alberta and Randy Westergaard. Garry Westergaard is no longer a director of Tri-West.

from Page (5)

10. On July 16, 1999 574029 Alberta Ltd. ("574029") was incorporated for the purpose of purchasing an additional 140 acres from my parents, Elmer and Val Westergaard. The directors of 574029 were (Keith) myself and my brother, Randy Westergaard. The shareholders of 574029 were Randy Westergaard and Westergaard Holdings Ltd., a company owned by myself.

11. Tri-West and 574029 then decided to amalgamate all of the lands totalling 217 acres (77 acres of which were owned by Tri-West and 140 acres which were owned by 574029). The purpose of the amalgamation was to facilitate a master plan to develop the total acreage under the tradename, "Gleniffer Lake Resort and Country Club". The

"I"

From page (7)

14. On June 5, 1995 a new Tri-West Company was incorporated named Tri-West Resorts Development Corporation ("Tri-West Development") as a vehicle to control a proposed joint venture between Tri-West and 574029. The directors of Tri-West Development were (Keith) myself and Randy Westergaard. The shareholders of Tri-West Development were Tri-West and 574029.

[illegible] (10)

25. On April 14, 1999 I incorporated [illegible] Development for the purpose of underwriting and funding a new second mortgage to Tri-West Development to cover the ongoing aforementioned costs. At that time I was the sole director and shareholder of Resort Development.

26. On April 13, 1999 I instructed [illegible] Foster, solicitors for Resort Development to prepare a new second mortgage in the aforementioned sum of $2,500,000.00 with an interest rate of 14% per annum for a term of [illegible] year. This mortgage was executed by myself and Randy Westergaard on behalf of and as directors of Tri-West and was registered on May 11, 1999.

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27. Funding for the newly intended second mortgage was committed by Aaron Acceptance Corporation ("Aaron") a company which I own, in the sum of $400,000.00, and by Canadian Western Trust Company in the sum of $180,000.00. The balance in the sum of $1,920,000.00 was not funded and was held in the name of Resort Development to be assigned to investors not yet obtained.

28. I thereafter issued letters to all of the first mortgage debenture holders under the initial Offering Memorandum advising them that it was in the best interest of Glennifer Lake Resort to contribute to the shortfall of $1,920,000.00 not raised. As a result of my efforts $1,274,000.00 of the remaining $1,920,000.00 was funded by the first mortgage debenture holders and several other investors. This brought the total funded under the newly intended second mortgage to $1,854,000.00.

29. In order to facilitate the new mortgage registration in the sum of $1,854,000.00 the first mortgage debenture holders agreed to postpone their mortgage in the sum of $6,500,000.00 to the new mortgage in the sum of $1,854,000.00. As a result the mortgage charges registered on title to the development were as follows:

a.	First mortgage	$4,000,000.00	Global
b.	Second mortgage	$1,854,000.00	Resort Development
c.	Third mortgage	$6,500,000.00	First mortgage debenture holders
d.	Fourth mortgage	$2,000,000.00	My mortgage

I

30. The summer of 1999 did not bring better weather. As a result lot sales and resulting cash flows did not meet expectations. As a result, in September, 1999 Tri-West Development defaulted in payments of the second, third and fourth mortgages above referenced.

31. On November 13, 1999 a general meeting of shareholders of Resort Development was held at which time a new board of directors were elected. Those directors were:

Directors

Rupert Salomon
Charles Dean
Kirjsten Christensen
Nick Vanderstelt
Randy Westergaard

Resort Development was authorized by the directors to start foreclosure proceedings. In addition, an alternative management and share purchase program was approved by the directors of Resort Development authorizing Resort Development to accept loans from shareholders and other parties to be secured by demand Promissory Notes carrying interest at 14% but entitling the lender to a bonus equal to 10% of the amount of the loan in addition to the aforementioned interest.

32. In the meantime Resort Development continued to maintain interest payments under the first mortgage to Global and instructed its solicitors, Vickers & Associates to commence foreclosure proceedings under the second mortgage in favour of Resort

I

Development in the sum of $1,854,000.00.

33. By April, 2000 foreclosure proceedings were finished. All development lands were transferred to Resort Development leaving only the first mortgage in favour of Global registered on the titles.

34. Since the default by Tri-West Development it has been necessary to inject considerable additional funds to cover the ongoing expenses of Glennifer Lake Resort. The following funds have been invested for this purpose:

Rupert Salomon	$215,138.80
Charlyn Investments Ltd.	$195,808.00
Aaron	$755,682.33
	$1,166,629.21

35. In July, 2000 Mr. Salomon and Charlyn Investments Ltd., advised they would no longer be providing funding for Glennifer Lake Resort. As a result throughout the months of July through October, 2000 Aaron funded cash flow short-falls for the purpose of operating the Resort which is included in the above figure of $755,682.33.

Spt/2001

36. Since the completion of foreclosure proceedings resulting in the titles being registered in the name of Resort Development considerable steps have been taken by Resort Development to re-establish the name and integrity of the Glennifer Lake Resort.

"J"

IN THE COURT OF QUEEN'S BENCH OF ALBERTA
JUDICIAL DISTRICT OF CALGARY

Action No: [illegible]

FILED
MAR 1 4 2001

IN THE MATTER OF THE
COMPANIES' CREDITORS ARRANGEMENT ACT
R.S.C. 1985, c. C-36, as amended

AND IN THE MATTER OF THE
ALBERTA BUSINESS CORPORATIONS ACT
R.S.A. 1981, c. B-15, as amended

AND IN THE MATTER OF THE
JUDICATURE ACT
R.S.A. 1980, c. J-1, as amended

AND IN THE MATTER OF
RESORT DEVELOPMENT FUNDING CORPORATION

AND BETWEEN:

RESORT DEVELOPMENT FUNDING CORPORATION

Applicant

- and -

**THE CREDITORS AND SHAREHOLDERS OF
RESORT DEVELOPMENT FUNDING CORPORATION**

Respondents

AFFIDAVIT

I, **KEITH WESTERGAARD**, of Calgary, in the Province of Alberta, Businessman, **MAKE OATH AND SAY THAT**:

1. I am the President of Resort Development Funding Corporation, ("Resort Development") and as such have a personal knowledge of the matters hereinafter deposed

"K"

TO: TRI-WEST RESORTS LTD., TRI-WEST SORTS DEVELOPMENT CORPORATION, 547029 ALBERTA LTD. and RESORT DEVELOPMENT FUNDING CORP.

By their solicitors
Vickers & Associates
Barristers & Solicitors
2025, 855 – 2nd Street, S.W.
Calgary, Alberta T2P 4J8

Attention: Denise M. Hendrik

This Statement of Defence is filed by:

FRASER MILNER CASGRAIN LLP
Solicitors for the Defendants, Green Theme Design Ltd. carrying on business under the trade name Randall R. Gibson & Associates.

The Defendants reside in Alberta.

The Defendant's address for service is:

ASER MILNER CASGRAIN LLP
Barristers and Solicitors
2900 Manulife Place
10180 – 101 Street
Edmonton, Alberta T5J 3V5
Phone: 423-7340 Fax: 423-7276
Attention: Ken G. Nielsen, Q.C.

at which address service of subsequent proceedings in this action may be served as effectively as if served upon the Defendants personally.

ACTION NO: 0101 04402

IN THE COURT OF QUEEN'S BENCH OF ALBERTA
JUDICIAL DISTRICT OF CALGARY

BETWEEN:

TRI-WEST RESORTS LTD., TRI-WEST RESORTS DEVELOPMENT CORPORATION, 547029 ALBERTA LTD. and RESORT DEVELOPMENT FUNDING CORP.

Plaintiffs

- and -

URBAN SYSTEMS LTD. and GREEN THEME DESIGN LTD. carrying on business under the trade name RANDALL R. GIBSON & ASSOCIATES

Defendants

MAY 25 2001

STATEMENT OF DEFENCE OF GREEN THEME DESIGN LTD. carrying on business under the trade name RANDALL R. GIBSON & ASSOCIATES

MAY 25 2001

11:05

Ken G. Nielsen, Q.C.
FRASER MILNER CASGRAIN LLP
2900,10180 – 101 Street
Edmonton, Alberta T5J 3V5
Phone: 423-7340
Fax: 423-7276

FILE: 136369-135/KGN

2. Ron Pearson Edmonton

#2106

Water For Life Comments:

I left the Edmonton session with a number of thoughts:

- Many of the issues raised by participants were immediate and personal. People were anxious to air their individual views. This is natural in a public forum. Most of the concerns were environmental in nature.

- It is important to receive this input, but also important that the eventual strategy is more balanced and long term in outlook.

- As a summary of the various issues and factors you have surveyed in the workbook, I would submit:

    - All initiatives under the strategy should be carefully defined from scientific and objective information. Alberta should invest in this area. For example, we need to understand and map our groundwater resource; canvass scientific opinion on water quality issues; conduct risk assessment models on global warming impacts; invest in monitoring capabilities and coordinate information between watersheds.

    - Number one priority should be to set and preserve (and possibly restore) minimum instream flows in all watersheds. Other policies and priorities follow from this base. This will preserve water quality and aquatic ecology for future generations.

    - Alberta then needs a comprehensive and innovative conservation program. My sense is that our existing resources and infrastructure can be utilized to accommodate mid and possibly longer term demands. The cumulative impact of such a program could be significant and relatively painless. However, it will involve a shift in the mix of consumption allocations and a willingness not to defend vested interests. Some ideas:

        - Facilitate licence transfers under the Water Act, *on a regulated basis*. If the consumption of one urban acre equals the consumption of one irrigated section, a program for converting a portion of existing diversions to unallocated reservations to support future population and economic growth could be very effective.

        - The big savings come from irrigation consumption. Regulate irrigation uses and limit future expansion. It now constitutes 70% of surface water consumption in the Province and 90% in the Bow and Oldman basins. I don't believe we can support this allocation given future growth patterns for the Province. It can be significantly reduced on an incremental and equitable basis:

            - Phase out unproductive irrigation, i.e. pasture and feed crops, through a regulated transfer (for compensation) to conservation licences. Modest pricing disincentives could possibly be imposed on users.

            - Place a moratorium on either future expansion or selected applications.

            - Set water consumption quotas on users calculated on the requirements of their crop mix.

            - Provide modest economic incentives to encourage licensed users to return unused portions of their allocations to instream flows.

            - Strict enforcement of riparian users. Do they , in fact, constitute 40% of total irrigated use? Their licences need to be monitored .under the same compliance standards as those of the Irrigation Districts.

        - Set and enforce standards for delivery and application systems.
    - All municipalities must be required to monitor household use. I believe the statistics show a 40% usage differential per household between Edmonton and Calgary.
    - Look at remediation of those diversion and dam projects which are currently not beneficial. Examples would be the small hydroelectric projects in Kananaskis. They provide little or no recreational benefits; have likely received full capital recovery; and provide a small input to the power grid. Perhaps there are legitimate future tradeoffs between restoring and protecting natural systems in these areas and the future development of projects which support growth in less environmentally sensitive areas.
- The Edmonton audience demonstrated a strong aversion to any development of the water management infrastructure. I believe that some of this reaction is based on misinformation. We tend to take for granted the benefits of the existing structure in Southern Alberta. Major dams are environmentally destructive and not cost efficient. However, the expansion of natural, off site storage reservoirs may be appropriate. Such reservoirs can supplement stream flow as well as support irrigation. For example, Mud Lake, near Fort McLeod, was originally proposed as a cost effective, non obtrusive alternative to the Oldman Dam. Is there further potential for this type of development in the Province?
- As we look to the very long term, inter basin transfer may well be inevitable. This is not a pleasant prospect, either environmentally or politically. Perhaps now is the time to start some non reactionary, sensible planning. We need to understand the water science; environmental impacts and engineering involved in such projects. There are many precedents in the U.S. to learn from. Perhaps future impacts can be greatly minimized. If we stick our head in the sand today, we may not make wise decisions in the future.
- A Water Strategy gives us the opportunity to improve current practices and reverse some poor decisions made in the past. It is important to review standards for oilfield practices; reduction and reuse in industrial applications; and agribusiness. The industries of the future in Alberta are heavy oil, oilsands and industrial agriculture. Have we carefully considered their impact on water resources. It is inexcusable that a quality lake such as Muriel is disappearing without a comprehensive understanding of the causes.

The framework to accomplish change is embodied in the Water Act. The Act was defined 6 years ago and proclaimed 4 years ago. Features such as water management plans; transfers; conservation objectives; an aquatic environment protection strategy and extensive compliance powers have been given general definition but no specific programs or applications. They will enable a future strategy to address and implement most of the initiatives listed above. The government has started to talk the talk. Are we prepared to take bold, comprehensive, progressive steps?

Respectfully submitted,

Ron Pearson
Edmonton
780 434 8614
rpearson@telusplanet.net

March 21, 2002

#1890

RAY AND FAY JONES
RR 2
DUFFIELD ALBERTA
T0E 0N0

3. Ray and Fay Jones Duffield

The Future of

April 15, 2002

We must treat water with greater respect and rethink the ways it is used. There has to be a plan in place. How and where agriculture is practiced in the province will have to be reviewed. So also the use of water by industry, eg. the oil industry.

Lorne Taylor is both enviroment minister and MLA for Cypress-Medicine Hat - the heart of Alberta's dry belt. This is within the Palleser Triangle which is historically known as a naturally dry, arid region. Taylor promotes grandiose schemes that no enviroment minister should endorse, e.g. the Meridian Dam on the Red Deer River. This giant dam would irrigate 160,000 hectares in the Pallister Triangle. This scheme includes the possibility of major transfers of northern Alberta water down to the dry belt so farmers in the dry belt can continue as always. Why farm in areas which cannot sustain such activity naturally? Northern Alberta is not awash in excess water. All of the province is dry. We don't underestimate the economic situation facing farmers but please don't revive discredited ideas of the past like giant dams and massive water transfers. The era of major diversions and water transferrals has ended. Such mega projects are outmoded and too destructive to the enviroment. We have to start conserving water and living within our means. If you start diverting rivers from northern Alberta the cost would be in the tens of millions of dollars. Water transfer is a bad idea.

River valleys are very dynamic ecosystems. Water levels fluctuate widely within a year and from one year to the next. Nature has evolved to adapt and even thrive in this dynamic habitant. But once a river is dammed, its dynamics are forever changed. Poplar forests downstream from dams on Alberta rivers are going into decline. Up to half the mature trees downstream have died since damming.

Go small scale and construct weirs in rivers as opposed to huge dams. This would allow the water to flow naturally at all times. The reservoirs created could then be used by wildl as well as for recreational purposes and the ecosystem can still be maintained. Don't allow building on flood plains. Encourage construction and more use of small dugouts that will catch and store rainwater. The government could help with funding.

Re: water license transfers: Water sharing may not be the solution, given the overwhelming non-support for these diversion schemes. We will have to rethink this process. Current generations will have to live within limitations on water availability to allow for future population growth. Gone are the days of "first in time / first in right". Encourage more efficient use of water through pricing to reduce overal use. Users who can create greatest value from their allocation will provide more economic benefits.

Our water supply and water quality are being put under increased strain, especially with the USA eyeing our "abundant supply"

Provincial water resources must be protected with a plan in place to meet future demands

Ray and Fay Jones

4. Barry Northey

Comments on Alberta's Water Strategy

The following comments are provided in response to the on-line questionnaire.

1. Most of the discussion materials focused on downstream consumptive uses of water in water deficit areas. Little attention was given to the water producing areas of the province, in particular the Eastern Slopes. A Policy for Resource Management of the Eastern Slopes Revised 1984 was first developed in 1977 and revised in 1984. It covers the 90,000 km^2 of mountains and foothills along the Rockies, usually referred to as the Eastern Slopes. Here are some quotes from this policy. Key words are in bold type:

    - *The **highest priority** in the overall management of the Eastern Slopes is placed on watershed management.*

    Watershed management objectives are:

    1. *To manage and develop natural resources in the region to maintain or **increase** the volume of water yield and the natural* timing *of surface and sub-surface discharge.*
    2. *To manage headwaters in the region to maintain recharge capabilities and protect critical fisheries habitat.*
    3. *To **manage intensively** the South Saskatchewan River Basin for water supply stability.*
    4. *To manage the North Saskatchewan and Athabasca River watersheds to maintain natural flows and provide the option for future **increase** in water yields.*

The reasons for focusing on increasing water yield in the northern basins, as opposed to the southern basins are unclear.

The Forest Reserves Act of 1964 formally established the Rocky Mountain Forest Reserve and recognised the need to protect these valuable watersheds.

The Forest Reserves Act

Section 4:

*All forest reserves within Alberta are set apart and established for the conservation of the forests and other vegetation in the forests and for the maintenance of conditions favourable to an **optimum water supply**.*

The original Forest Reserves Act stated that the reserves were established *"for the conservation of forests and other vegetation, and the maintenance of conditions favourable to a* ***maximum*** *water supply."* ***Maximum*** was later changed to ***optimum.***

Legislation and policy established the maintenance and increase of water yield as a priority, however this has not been implemented in any planned way.

The current pattern and structure of today's forests is mainly due to wildfire. Early forest managers recognised the importance of the Rocky Mountain forests as the headwaters of the Saskatchewan Rivers that provided water for downstream human consumption and agriculture. The headwaters of the South Saskatchewan River cover approximately 15% of the basin area, yet produce over 85% of the streamflow. The connections between wildfire and watershed impacts were recognised early on by the Eastern Rockies Forest Conservation Board (ERFCB). Much of the Rocky Mountain Forest Reserve was closed to motorized access until the 1960's to reduce the risk of human caused wildfire.

The United Nations formally recognised the importance of good watershed management for human populations and designated the International Hydrologic Decade in the mid 1960s. This prompted many studies on the functioning and management of watersheds worldwide. Alberta undertook several studies, some under the broad Alberta Watershed Research Program. Two important forestry related studies were done at Streeter Basin in the Porcupine Hills (montane) and at Marmot Basin (sub-alpine) in Kananaskis Country. Both studies concluded that the design of the size and configuration of forest clearings could affect snow deposition and thus influence (increase) the amount of water available for streamflow. The reduction in evaporation due to the removal of forest cover also increased the amount of water available for runoff, for a while after harvest.

A related study at the James River showed that small clearings about two tree heights in diameter (2-3 H) in lodgepole pine stands are the optimum size for snow capture and retention. The Tri-Creeks study near Hinton looked at the impact of commercial logging on the hydrology and fisheries of foothill streams. The results and statistical validity of this study were limited in value due to the shortened post-harvest monitoring period. Other studies suggested that normal commercial timber harvesting operations would increase water yields.

A great deal of research this century was directed at quantifying the impacts of forest harvesting on streamflow and water quality in many ecosystems around the world. The hope was to model these impacts so that forest managers would be able to predict the impacts of forestry activities and thus be able to manage within acceptable limits, or produce desired outcomes. Some success has been achieved, but most studies were of necessity undertaken on small basins and are not easily extrapolated to large basins. The results were variable and sometimes inconclusive, reflecting the complexity of the natural systems and the hazards of research. Modelling complex systems is difficult at best.

Much of the watershed research in Alberta was conducted by the ERFCB, the Canadian Forest Service (CFS), the former Research and Watershed Branches of Land and Forest

Service (Tri-Creeks), the former Alberta Environment (Spring Creek) and Dr. Richard Rothwell of the University of Alberta. Some of the research results formed the basis for watershed protection sections of the provincial timber operating ground rules.

The CFS hydrology program along with several watershed studies were dropped or terminated prematurely due to a lack of funding. The Province has a poor track record in terms of long-term funding for water based research. Dr. Robert Swanson, the lead researcher for the CFS has produced a computer-based water yield simulation procedure based on the US EPA WRENSS procedure and local research results. It is available to Departmental staff.

Even though policy and legislation created much research interest in managing the southern Eastern Slopes for water production, other priorities took over, such as recreation, fibre production, etc. This was probably due mainly to the following factors:

- Water was not deemed to be scarce, so there was little need to manage for it.
- Water had no price and thus it could not compete with saleable entities such as pulp, lumber and golfing.
- Few people understood, or believed that timber harvesting could increase water yield, or if they did, the potential amounts were deemed to be insufficient and at the wrong time of year. The scope of the management needed to produce a meaningful flow increase contradicted other objectives, such as even flow forestry.
- Building dams or diverting water from northern basins are more reliable methods of securing water. Most of the natural water flow and potential water yield increases occur in the spring runoff when water is needed the least (i.e., in surplus). Increased yields would simply runoff, unused or captured to Saskatchewan. A strategically located dam could capture and hold that water and be of more use than any water yield management scheme.

2. Some other issues and comments:

    - Water will not necessarily become scarcer unless evapotranspiration increases. The demand for it will increase with population and industrial growth. Rivers will go on producing runoff in proportion to incoming precipitation and evapotranspiration, as usual. There is an argument that diminishing glacier melt will reduce yields.
    - Dendrochronology studies reveal that severe drought conditions have been a natural phenomenon in the past few centuries in North America. These events have nothing to do with human-induced global warming. We must expect and accept droughts as naturally occurring phenomenon.
    - The choice between "sustainable" aquatic ecosystems and economic growth is a never-ending human situation. The notion of sustainability is somewhat bogus. A mere 10,000 years ago Alberta was covered by ice. Natural history studies suggest that Alberta was mostly grassland a few thousand years ago
        - The notion that Albertans can *choose* between these options may be constrained by Federal legislation such as the Fisheries Act.

- The current Green/White Area designation goes a long way to protecting the Green Area portions of these ecosystems. Conversion of some Green Area lands to White Area is a concern.
- Flooding has more to do with the location of human settlement than the management of water resources. If you live in the *flood* plain, you are eventually going to get flooded. That's why it's called the *flood* plain.
    - Stream channelization may temporarily resolve a flooding issue for a few, but simply moves the problem up and downstream as the channel adjusts.
- Extensive wildfire can have major impacts on water supply and quality. These impacts can be arguably both good and bad. Fire management needs to be (remain) a high priority in the southern basins.
- Soil salinization resulting from irrigation is a real long-term threat to economic sustainability on some soil associations.
- Heavy metal mobilization and contamination is a potential concern for all reservoirs.
- Regulated flows may be killing off valuable cottonwood riparian habitat in prairie rivers.
- The lack of a realistic pricing structure for water sends false economic signals to the market. This valuable resource is priced as though it is valueless and is thus treated as such.
- We did some preliminary faecal coliform sampling of surface waters in a few foothills streams. The sampling revealed that by late summer, several of these streams were unfit for swimming. The source of the contamination was unknown. It could have been anything from cattle, to beavers to human use.
- There is a tendency to encourage private gain at public risk. The strongest voices are usually those who are likely to benefit the most from certain activities. Their expectation is that the public will bear both the up-front and post development costs, should things go wrong.
- If you build it, they will come. The cycle of supplying water to arid lands to *meet the needs*, simply increases the demand for more water as more people move to these desirable locations.
- *Pollution* can be good. The Bow River fishery in the Calgary vicinity is the result of *nutrient enrichment* (pollution) from Calgary and species pollution – Rainbows and Browns.

Barry C. Northey R.P.F.

5. Dorene A. Rew Red Deer

Dorene A. Rew
403, 10 Stanton St.
Red Deer, AB T4N 5S6

March 17, 2002

Water For Life
c/o
EQUUS Consulting Group Inc.
250 - 9707 110 St. NM
Edmonton, AB T5K 9Z9

Dear AENV and EQUUS Consulting,

Is it just my imagination or is there a bit of subliminal messaging in the booklets and in the workbook? Water pipelines, water pricing, water transfers/ and inter-basin transfers come up a lot of times and yet there is no explanation about whether the Alberta government or the AENV have had lawyers check out whether or not we can do stuff like that in Alberta and not trigger NAFTA Chapter 11. Personally, I think that we are extremely lucky all the transferring done so far has not brought the American companies up in droves to buy up water licenses and pipeline Alberta's water back to the US of A or to tankers off one of our coasts for shipment around the globe.

It is also my opinion that both the Alberta and federal governments are being very naive by not looking more closely at this seriously flawed agreement drawn up for us by former PM Mulroney and his US friends (a document which the Liberals promised to get us out of and never did). If all the lawsuits presently before the secret courts of the NAFTA go in favor of the big business interests that brought them before the courts, Canadians will be out a total, including the MMT/Ethyl Corp fiasco, about a billion dollars. I don't know about you, but I could find a lot more productive uses for that money. Therefore, caution is warranted in mega amounts.

My Comments on the Workbook

part "a"
what are the challenges?

Under the government's current plan of 'business as usual' which places a heavy reliance on water intensive businesses and industries, usage will rapidly exceed water supply in many parts of the province, or else the water will become so contaminated that it will be undrinkable or unusable for other purposes. Yet even given this potential, there are statements, both in the workbook and in the water fact booklets, that infer that the government is still thinking about allocating, allocating, allocating what could be non-existent water for more and more water intensive projects rather than applying its powers to assist private citizens and industries to become more efficient in their use of water.

Running out of water is not something any of us wants to do; therefore, it seems logical to me that humans (the so called thinking animals) should consider changing their views on what constitutes 'sustainable economic growth.' When you do not know what climate change will bring, it makes absolutely no sense to build mega-dams, or mega-water diversion projects when, for example, the odds are slim that enough rain will fall, or the river flow rates could drop even more.

This kind of infrastructure is prohibitively expensive for a government which is slashing healthcare, other services and staff because it says it hasn't any money to spare. Much better to help people finance there own small water conservation/ efficiency projects, or offer other incentives such as tax breaks and so forth.

The major challenge, as I see it, is to wean the government off its addiction to mega-projects and teach it how to 'think smart, think small' and how to 'do more with less.' The government has (by its encouragement of a 'boom and bust' economy) forced the rest of us to learn how to do more with less. It's time politicians paid attention to us when we tell them how it is done. Repeat after me: **The economy is not sustainable if it drains the rivers dry, pollutes the air, water and soil and damages the health of humans and the planet.** It's as simple as that.

part "b"
achieving safe, secure drinking water
The first and simplest way to keep our drinking water secure is to stop wasting it. One of the major things the new Water Act was supposed to achieve was water conservation, but in actual fact the government has continued to focus on allocation, just as the old act did. **The government's first priority should be to find an effective way to incorporate water conservation/efficient water use into its allocation/licensing regulations.**

The second way is to stop polluting it. As the US and many parts of Canada have discovered, it costs mega-bucks to clean up contaminated water. **Preventing water contamination is much cheaper than after the fact clean-up.** Certainly an over-allocated water source is more easily contaminated than one that is not.

While the government has reportedly been 'managing' our surface water and 'monitoring' our groundwater sources for decades, I think even the government will admit that much is yet to be learned about both. It is therefore very important that we obtain better data concerning what constitutes 'enough' water to satisfy the in-stream needs of rivers and streams and what state our groundwater is in now, so that if the drought situation continues predictions of water availability will be more accurate.

If water sampling/testing is as expensive as the workbook says, perhaps the government ought to subsidize testing for people with private water systems. I say this in light of the fact that the source water for many underground aquifers (and hence water from wells drilled into them) is not always known. Therefore the well on private land can be contaminated by the acts of others and is thus not under the well owner's control. Nearby oil and gas wells, for example, were responsible for damaging a well on property once belonging to me. At that time, all the government would do was a simple analysis for bacteria , pH, a few common minerals, cloudiness and smell, for I think it was, $40. In this day and age far more tests are needed to assure water is safe to drink.

The water fact booklet says that households could cut their water consumption by 50 % and not be terribly inconvenienced. Certainly agriculture and other industries could reduce water use considerably as well. The Israelis made the desert bloom with far less water than irrigation farmers use in southern Alberta per acre/hectare.

Options for small municipalities

The government needs to move very quickly on this issue since many small municipalities are already having water and sewage problems and are seeking to solve them by linking up with big water companies such as EPCOR or the city of Red Deer, for example. If the government does not step in and outlaw water monopolies such as what EPCOR seems to be working towards, many people will not be able to afford water.

Also, while the small towns and municipalities around Red Deer (and the City itself) might benefit from having one large, state of the art facility for water purification and sewage disposal, there is the potential to over-draw water from the Red Deer river which is already under severe stress from urban centers and industry which are constantly increasing their demand upon the river instead of implementing water conservation strategies.

I would suggest that urban centers and possibly industries as well, be given realistic water quotas attached to licenses and that they be compensated (tax breaks or other incentives) for using less. The urban centers in turn should charge for water (metering is essential) and sewage at rates more in tune with the actual cost of delivering this service. Having said that, I will also say that all levels of government should offer incentives for water efficiency retrofits (gray water systems, low flow toilets, shower heads etc.) to end users - especially for low income families.

How water is allocated in Alberta

Again my personal opinion is that, in this respect, the new Water Act was not much, if any improvement over the old one. The people who gave their time and energy to help create the Water Act had many good ideas which the government ignored.

Perhaps the government ought to re-visit a few of those ideas now. For example the 'first in time/first in right' phrase (carried over from the old act) needs qualifying and quantifying as it will have a devastating effect on new users, who in times of severe droughts will have, in essence, no rights. A fairer way to do it would be to apportion the available water based on a percentage of the available water as opposed to allowing the full allotment to the 'first in time' users. These 'first in time' users might get a bigger share of their licensed allotment (depending on how 'first' they were) than the newer users, but if done this way no one would be left totally without water.

I also think the government will be in for a big surprise if it does do a thorough study of groundwater availability, especially in the more drought prone areas in the east-central and southeast parts of the province. I travel to Stettler a few times a year and I can tell you that in my 64 plus years I have never seen the sloughs so dry or heard more complaints about the state of well water. Mind you, underground 'rivers' have been found under a desert like surface, but wells at easily accessible depths, at least in the Stettler area where I grew up, have been used at least as far back as the 50's by the oil and other industies.

From what I have read, the government seems to be 'allocating' a standard amount of water to the river for fish survival and so on, with no real consideration for individual ecosystem differences among the various rivers. I'd like to see the government promote more water hold-backs, for whatever reason, but not behind dams. Perhaps these hold-backs could be 'deposited' in an ecotrust/ future trust, for emergency purposes. The big thing here is that nothing that even resembles "price," or "sell" should be in the wording of these documents.

Judging from what I read in the last round of water talks on 'management' it appeared that the government might consider selling water licenses to foreign companies. This freaked me out in light of the fact that Corsair has a water license in perpetuity (a transfer of one from a 'first in time' user to be more exact) and also a permit to 'pipeline' the water to enhance oil recovery. What will happen, for example, if Corsair no longer needs this water and the pipeline is still in place? Could someone take over that water license and extend the pipeline to wherever - maybe to the US border? **Would the government please get a bit more pro-active about potentials like the above?**

The statements on page eight do not address the problem from the right direction - conservation, not allocation. I mean a half of nothing is nothing. Right? As I have said on other occasions, small storage reservoirs, diversions, short distance underground pipes have some merit, given factors such as climate change, or increased evaporation. **Mega projects are usually not cost effective at the best of times. The least costly and best option is to make the best use of what nature/God gives us to work with.**

Water Conservation

There are many options to promote water conservation and many ways to conserve water. **We need to look at this need to conserve water as an opportunity rather than an impediment.** Unlike the first statement on page nine, however, we must never "establish a price for water." **Water has "value" because it is the giver of life, but it can have no "price."** The licenses, however can have a "price" or "fee." And this price or license fee can go up depending on how scarce the supply of water is. Fees for services, like water delivery, purification and sewage treatment along with license fees can all be used as 'leverage' along with other incentives to promote water conservation.

Education is, of course, an important tool, however more people will be reached 'through their wallets' or through rebates for new purchases of water miser appliances, water miser irrigation systems, or even for retrofitting old equipment and so forth.

I would like to suggest that instead of allowing people to 'sell' unused portions of a water license that they be encouraged to turn this portion back to the government in return for a lower license fee. This method should bypass NAFTA. The government or the water co-op could then decide whether or not to issue a license to a new user or to 'bank' the extra water for future need. This would also give the person who gives up some water the opportunity to pay a higher license fee again to reinstate the old allocated amount should he acquire more land or whatever. As it is now, I would think some people would fear loosing a portion of their allocation in case more water would not be available should they need it.

Safeguarding Alberta's 'healthy' ecosystems

A holistic approach is needed

First and foremost, not all of Alberta's ecosystems are presently 'healthy' thanks to decades of staff cuts and other ill thought out money grabs during 'bust' years. Maintaining healthy ecosystems requires the attention of every government department working in concert as well as support from the citizens of this province. Most of all, it requires the government to adopt a new attitude regarding its priorities.

At the moment, most of the world's governments have not yet come to the realization that 'the economy' - that is 'business as usual' - can not expand exponentially for ever. One would think that three stock market crashes in a decade would have given some pause for thought. But apparently, though many economists are now convinced that the current premise is flawed, most politicians have yet to be reformed.

Also, our attitude towards 'acceptable' amounts of pollution have to change. In reality, there is no acceptable amount of a potentially lethal substance. What we considered 'acceptable' in the past, in many cases, has since proved to be high enough to cause health problems or even human deaths. **The precautionary principle must be included in all government acts.**

At least two of the questions on page 10 are again a backwards approach. **The primary focus has to be on the health of the ecosystem that is supplying our water**. Then we should consider how much water humans can safely consume without harming the water supply. Then, and only when the health of the river basin/groundwater system has been satisfied and our basic human need for non-polluted water is assured, can we consider "economic' uses. Anything other than this will be suicidal in the long run.

Since our supply of water is limited - in some places more so than others - it seems logical to me that the government should not be encouraging water intensive activities in region where supply is low - read mega-thousand head intensive livestock operations (or as the government's new act euphemistically calls them 'Confined Feeding Operations') in the south. Humans are, for the most part, a resourceful lot. I'm sure less water intensive businesses could be found that would be equally lucrative.

I guess my point is that economic development opportunities will not be lost, they will just be different opportunities and more sustainable over the long haul. The old saying, before derivative trading and stock market hedging led us astray, that people should 'live within their means' needs to be resurrected. As far as the earth goes, we have used up all our interest and we are living off the capital and that's a dangerous way to live.

Yours truly,

Dorene A. Rew

RECEIVED
Client Relations Unit
Alberta Environment
APR 18 2002
AR #. 3803
File #.

6. Dave Westgate Calgary

Hon. Lorne Taylor (PC)
423, 10800 – 97 Avenue
Edmonton, AB
T5K 2B6

April 15, 2002

Re: Transfer Environmental Reserves to the Crown.

Dear Sir:

As part of Alberta's Water Strategy to safeguard Alberta's water supply I make the following suggestion for consideration by your officials:

Environmental reserves be created, if not already created, along all water bodies to a distance of 66 feet from the bed and shore. These environmental reserves should be titled to the Crown under the administrative control of Public Lands. Existing Reserves along water bodies, Environmental or otherwise, should be transferred to the Crown.

The transfer of ILO's to Provincial control demonstrates that a Provincial approach to protect all Albertan's is necessary for locally contentious and divisive items. (One would think local authorities would be relieved that this responsibility has been removed from their jurisdiction.) Usage of land along the bed and shore of water bodies under Provincial control would relieve local authorities of another locally contentious and divisive item. The local pressures for inappropriate development along the bed and shore of water bodies could be removed from the shoulders of local authorities.

The consistent land use policy as outlined in the Municipal Government Act could be implemented by the Province to ensure the safety of our water supply.

Public Lands has the infrastructure presently in place to implement this proposal immediately. Public Lands has Public Land Officers and a Shoreland Management Office already existing.

The cost of acquiring existing Environmental Reserves from local authorities by expropriation would be low as they are lots not suitable to be building lots.

A method to dedicate these types of lands in the future could be through the Municipal Government Act. (Even if this main proposal is not implemented I would recommend the MGA be amended to make the creation of Environmental Reserves along water bodies clearly mandatory and outdated reserve designations be updated– if you wish, suggestions as to the legislative changes required could be submitted by me for consideration to Municipal Affairs.)

There is an example of the above as a result of the stabilization of Buffalo Lake This occurred with the acquisition of environmental reserves along the bed and shore at Buffalo Lake from the Village of Rochon Sands and from the County of Stettler. As a landowner at the Summer Village of Rochon Sands at Buffalo Lake I am extremely happy that the lake shore reserve in front of my cottage is owned by the Crown and managed by Public Lands. The local authority should be happy as well since stewardship of this land now rests with the Crown

Yours truly,

Dave Westgate

Dave Westgate
1207 Kerwood Cres SW
Calgary, Alberta
T2V 2N7

cc The Hon. Ralph Klein, Premier – MLA - Calgary Elbow
The Hon. Mike Cardinal (PC) - Minister, Sustainable Resource Development
Judy Gordon – MLA - Lacomb Stettler
Anne McInerney – Environment - Communications Division
Pat Valastin - Alberta Conservation Association

7. T. Punko Fort McMurray

#1055

April 14, 2002

Equus Consulting Group Inc.
250 – 9707 110 St. NW
Edmonton, Alberta
T5K 9Z9

Dear Sir;

Re: Water For Life Workshop – Westlock, Alberta

I made a point to attend this Workshop since I strongly believe that the issue of water in Alberta is very important to me as well as all Albertans. We have let this very important commodity and vital resource go on far too long without having proper checks and balances in place in order to ensure that Albertans will always have a plentiful supply of quality water for their use.

Alberta Environment is to be commended for taking the initiative to implement a "consultation" process with Albertans. Although I am sure that you will receive many various views on the issues you raised in your Workbook, but hopefully, they will all be helpful and taken into account in a reasonable manner by the continuing process.

Along with my Workbook that I filled out, I wish to add on a number of comments that I believe should be taken into account along with what you have in the Workbook, which I am enclosing along with this letter. These comments are being to some degree, based on what I heard during the Westlock Workshop and of course, my views.

Firstly, I am very uncomfortable with the way in which your Workbook is worded, as I will speak to in more detail later in this letter. The second issue that I want to raise is in which the way this consultation process was advertised and the manner in which you expect Albertans to respond. You mentioned that there were copies mailed to approximately 1,400 Albertans, but I am sure that there are far more than 1,400 Albertans that are using water and should be also encouraged to share their opinions on this vital subject. Because of this, I fear that the team that may be faced with the task and responsibility of analyzing all of your compiled information, the number of concerns or recommendations, etc. may not be looked at in a manner that will not give an issue as much importance as one should. When dealing with an important resource such as water, we must proceed on this very, very carefully and reasonably. There have been far too many examples in the past whereby our governments chose to make very important decisions, policies, etc. based on what seemed to be most politically popular rather than choosing to demonstrate good sound strong leadership and making a decision that may not have been the most popular, politically, but sure made the most sense, realistically and showing reasonable responsibility for looking after our resources. Already, our environment, and in this case water, has already deteriorated in quality and quantity, due in some instances, to poor judgment on the part of our regulators responsible for looking after this resource. I believe that in most instances this was done mainly for the purposes of economic gain. This type of thinking has to STOP! Of course, we need to take into account economic gain, but be have to be very careful on what the costs are going to be in a trade-off, from an environmental perspective. Protecting our environment must be just as important, if not more important than making money, because if we go too far in destroying our environment, we may eventually not have anything worthwhile left to see as a result, so there goes your economic benefits.

I believe and hope that us Albertans will have at least another opportunity to review and share our thoughts later on within this process of events BEFORE our Government makes any final decisions.

Further to the challenges, etc. that were laid out in your Workbook. Although many of them were good, the problem that I had in answering them was that many of them depended on how one interpreted what was being implied. In other words, I think that one would need to know more of the facts and specifics of what was being proposed before one could really judge whether they strongly agreed or disagreed. For example, Part a, d. I don't think anyone today could say with certainty that climate change will seriously affect water flows in Alberta. It "may", but "will" is a bit hard to accept since I don't thank that even with our modern technology, we have got the capability of controlling our climate. Granted, if we do continue to experience that type of climate that we had for the past number of years, naturally we will be affected, but we could just as quickly experience some very different climates in the near future, whereby we may be faced with much more water that we need at that point.

On the section dealing with reliable quality water supplies for a sustainable economy; Option 1 – Determine groundwater availability throughout the province. Do we have the technology to be able to determine this and at what cost? To my knowledge, speaking with a number of water well drillers, currently, no one has the capability of being able to do this with a reasonable degree of accuracy, so if this is true, why are we asking such a question?

These are the same types of concerns that I have throughout this Workbook. I cannot understand how anyone would think that they would be able to develop a meaningful and reasonable and fair set of policies or regulations pertaining to our water form this. The information that you may have gathered may certainly assist you to some degree, but I would strongly suggest that consideration be given to perhaps implementing a different format and method for gathering helpful information through a consultation process.

I could go on and on with further comments and thoughts, but hopefully, I may get another opportunity to share them at a later date through further consultation.

If anyone has any questions or comments about what I have said, please feel free to give me a call at 1-780-743-5517.

Sincerely,

T. Punko
7410 – Bulyea Ave.
Ft. McMurray, Alberta
T9H 1B6

#1056

April 14, 2002

Equus Consulting Group Inc.
250 – 9707 110 St. NW
Edmonton, Alberta
T5K 9Z9

Dear Sir;

Re: Water For Life Workshop – Ft. McMurray, Alberta

I made a point to attend this Workshop since I strongly believe that the issue of water in Alberta is very important to me as well as all Albertans. We have let this very important commodity and vital resource go on far too long without having proper checks and balances in place in order to ensure that Albertans will always have a plentiful supply of quality water for their use.

Alberta Environment is to be commended for taking the initiative to implement a "consultation" process with Albertans. Although I am sure that you will receive many various views on the issues you raised in your Workbook, but hopefully, they will all be helpful and taken into account in a reasonable manner by the continuing process.

Along with my Workbook that I filled out, I wish to add on a number of comments that I believe should be taken into account along with what you have in the Workbook, which I am enclosing along with this letter. These comments are being to some degree, based on what I heard during the Ft. McMurray Workshop and of course, my views.

Firstly, I am very uncomfortable with the way in which your Workbook is worded, as I will speak to in more detail later in this letter. The second issue that I want to raise is in which the way this consultation process was advertised and the manner in which you expect Albertans to respond. You mentioned that there were copies mailed to approximately 1,400 Albertans, but I am sure that there are far more than 1,400 Albertans that are using water and should be also encouraged to share their opinions on this vital subject. To date, I have seen more advertisements in our local newspaper about this Workshop than I did PRIOR to it actually taking place. Because of this, I fear that the team that may be faced with the task and responsibility of analyzing all of your compiled information, the number of concerns or recommendations, etc. may not be looked at in a manner that will not give an issue as much importance as one should. When dealing with an important resource such as water, we must proceed on this very, very carefully and reasonably. There have been far too many examples in the past whereby our governments chose to make very important decisions, policies, etc. based on what seemed to be most politically popular rather than choosing to demonstrate good sound strong leadership and making a decision that may not have been the most popular, politically, but sure made the most sense, realistically and showing reasonable responsibility for looking after our resources. Already, our environment, and in this case water, has already deteriorated in quality and quantity, due in some instances, to poor judgment on the part of our regulators responsible for looking after this resource. I believe that in most instances this was done mainly for the purposes of economic gain. This type of thinking has to STOP! Of course, we need to take into account economic gain, but be have to be very careful on what the costs are going to be in a trade-off, from an environmental perspective. Protecting our environment must be just as important, if not more important than making money, because if we go too far in destroying our environment, we may eventually not have anything worthwhile left to see as a result, so there goes your economic benefits.

We are seeing a prime example of this right in our region. The oil sands companies have been allowed to virtually withdraw all of the water they required. Furthermore, our regulators currently do not know, for certain how good the quality of the water is in our lakes and rivers since many people in this region believe that the water quality has been drastically affected to date as a result of industrial cumulative effects (pollution). If our regulators did their job to date, currently we may not be needing to be so concerned about our water qualities and quantities, but as things currently stand on that issue, yes, there is absolutely no doubt in my mind, we NEED to be concerned and we need to start dealing with this issue in a very responsible manner.

I believe and hope that us Albertans will have at least another opportunity to review and share our thoughts later on within this process of events BEFORE our Government makes any final decisions.

Further to the challenges, etc. that were laid out in your Workbook. Although many of them were good, the problem that I had in answering them was that many of them depended on how one interpreted what was being implied. In other words, I think that one would need to know more of the facts and specifics of what was being proposed before one could really judge whether they strongly agreed or disagreed. For example, Part a, d. I don't think anyone today could say with certainty that climate change will seriously affect water flows in Alberta. It "may", but "will" is a bit hard to accept since I don't thank that even with our modern technology, we have got the capability of controlling our climate. Granted, if we do continue to experience that type of climate that we had for the past number of years, naturally we will be affected, but we could just as quickly experience some very different climates in the near future, whereby we may be faced with much more water that we need at that point.

On the section dealing with reliable quality water supplies for a sustainable economy; Option 1 – Determine groundwater availability throughout the province. Do we have the technology to be able to determine this and at what cost? To my knowledge, speaking with a number of water well drillers, currently, no one has the capability of being able to do this with a reasonable degree of accuracy, so if this is true, why are we asking such a question?

These are the same types of concerns that I have throughout this Workbook. I cannot understand how anyone would think that they would be able to develop a meaningful and reasonable and fair set of policies or regulations pertaining to our water form this. The information that you may have gathered may certainly assist you to some degree, but I would strongly suggest that consideration be given to perhaps implementing a different format and method for gathering helpful information through a consultation process.

I could go on and on with further comments and thoughts, but hopefully, I may get another opportunity to share them at a later date through further consultation.

If anyone has any questions or comments about what I have said, please feel free to give me a call at 1-780-743-5517.

Sincerely,

T. Punko
7410 – Bulyea Ave.
Ft. McMurray, Alberta
T9H 1B6

A. H. (Al) Taylor
8915 33rd Ave N.W.
Calgary, Alberta
T3B 1M2
April 14, 2002

8. Al Taylor Calgary

Equus Consulting Group
#250, 9707 110th St NW
Edmonton, Alberta
T5K 929

Ré: Alberta Water Strategy

Dear Sirs:

This letter refers to the recently distributed "Water For Life" workbook and provides my responses to the parts of that document which I do not find satisfactorily presented in the workbook. I should make clear at the outset that, although I have been an active member of the Bow River Basin Council and it`s predecessors for many years on behalf of the Calgary Area Outdoor Council, the opinions I offer herein are my own and have not been reviewed by the Outdoor Council and cannot, therefore, be taken as representative of the Outdoor Council`s official views or those of its member-organizations.

Most of the detailed questions in Part (b) of the "Water for Life" workbook are at least reasonably appropriate to the stated purpose of seeking thoughts and ideas on the future of Alberta`s water. The opportunities provided for adding options not listed make it possible to bypass the leading nature of some of the option statements presented. It is unfortunate, though not a fatal flaw, that (perhaps for political reasons?) the segments of Part (b) are not presented, as they should be, in the same sequence as the quite reasonable "fundamental objectives" stated at the end of Part (a).

I do agree that the four fundamental objectives presented are a reasonable set to guide Alberta`s water strategy but, difficult though it may be, it should be recognized and acknowledged by all concerned that these four objectives must be assigned relative priorities. In my view, the first three objectives are clearly listed in the right order of decreasing priority, downwards, as they are presented. The fourth objective is to obtain the tools to move effectively toward the other three objectives and so it is really on a different level. It could perhaps be listed either last or first.

Unfortunately, the statements of "Future Challenges" presented in Part (a) of the workbook are, in my opinion, almost all unsatisfactory and inappropriate, as presented. It seems to me that they can serve only as a poll of vague, ill-founded "degrees of worry", with possible political usefulness, rather than as a serious and honest attempt to list, and indicate the nature of, the important issues that Albertans (and the Alberta Government) will need to deal with in the future with respect to water. Consequently, I`ll offer, below, a substitute list of statements that I consider appropriate and meaningful, based on the core subject matter of the statements presented in the workbook. I`ll indicate my agreement or disagreement with these. If my statements seem undesirably verbose, please focus on how they differ in content from those in the workbook.

a. As fresh water is finite, both in quantity and in its capacity to absorb pollutants without significant deterioration, there will be significantly less water per capita available as a resource for human use in the future, if population and

commercial/industrial development are allowed to continue to grow. (I agree with this statement. Indeed, it seems that its validity is pretty much self-evident.)

NOTES: It should be clear to any thinking person that, in a world with finite resources, growth cannot continue indefinitely. In the case of water, the limits of resource supply and capacity will be reached much sooner in the drier, southern half of Alberta than in the north, given equal growth rates and assuming no major inter-basin transfers of water (the latter have very serious negative implications). Parts of southern Alberta have already reached the stage at which there is no longer supply and capacity excess to human demands so that trade-offs and adjustments among users and uses must be worked out.

A corollary to this first "Challenge Statement" is that, of course, if growth in human water use is halted before serious water scarcity develops, then, in Alberta, we will remain in the fortunate position of having adequate water supply and capacity to serve our needs.

The ultimate implication of this "Challenge Statement" is that, **as growth of population and of economic development do depend on water, growth must and will end in Alberta (and elsewhere) at some future point, be it far distant or nearer.**

b. Access to safe drinking water is now a significant issue for some Albertans, mainly in rural areas in some of the drier parts of the province. **If population and commercial/industrial development are allowed to continue to grow, access to safe drinking water will become a significant issue for a growing proportion of the Alberta population.** (I agree with this compound statement.)

NOTES: With continued growth, access to safe drinking water will become an increasingly prevalent problem first in the drier areas of the province, particularly if types of economic development which bring a high rate of water pollution, such as intensive livestock operations and livestock processing facilities, are allowed to continue to proliferate there.

Clearly, a corollary to the second "Challenge Statement", above, is that, if growth is halted, access to safe drinking water will not become a significant issue for more Albertans and, indeed, as management of use of available water improves, it may cease to become an issue for any Albertans. **To the extent that water-polluting economic development and, eventually, population growth are restricted in areas where there is increasing pressure on water resources, the time when access to safe drinking water becomes a significant issue for many more Albertans will be postponed.**

c. **Water availability inevitably will, and should, limit growth in Alberta.** (I agree with this statement -see above. The only question is: "At what point?")

NOTES: Again, we live on a finite planet, with finite resources. Ultimately, growth of both economy and population must and will slow and, finally, end. It is highly desirable to arrange to bring about this change in as orderly a way as possible, sooner rather than later, in order to preserve as much as possible of the quality of our lives and our surroundings, not foul our nests much more than we already have and not abandon our society and the human race to the chaos that will someday result, if we don`t take charge of our fate.

d. **Human-caused, relatively rapid climate change can be expected to affect water flows in one direction or another in Alberta over time, probably significantly.** (I agree.)

NOTES: Major changes in climate, which certainly affect water flows, have occurred many times in the course of the earth`s long history and they can be expected to occur naturally in the future. For the most part, these changes have been very gradual, when compared to a human lifetime. Now, human activities, particularly the burning of fossil fuels, are causing changes in climates which are quite rapid in terms of earth history so that the changes can begin to be felt within a human lifetime. These human-caused changes are, of course, linked to the intertwined growth of economy and population. Restricting that growth can be expected to reduce the amount of rapid climate change. If the absolute amount (not the per capita amount) of the relevant substances which enters the atmosphere can be reduced while growth continues, then the rate and extent of climate change can also be expected to be reduced. Even if this can be done, however, it can hardly be expected to be more than a temporary measure to postpone the time when growth must end if drastic changes in climates are to be prevented. One of the key effects of climate change is, of course, the effect on water flows. As far as I am aware, it is not yet known whether, in a particular region, such as southern Alberta, human-caused climate change will result in a net increase or decrease in water flows over time, although the answer may seem apparent to many.

e. **To the extent that industrial and agricultural growth are allowed** (not to mention: encouraged), they will create greater demands for water, not always in places where water is plentiful. (I agree)

f. In some of the drier areas, **where the water demands of further economic growth can be satisfied only at the expense of healthy, sustainable ecosystems, a choice must now be made between biologically healthy and sustainable aquatic systems and economic growth.** This situation will obtain in an increasingly greater part of the province as time and growth go on. (I agree.)
NOTES: Surely, when faced with a choice between healthy, sustainable biotic systems that perform so many functions desirable and useful (ultimately, essential?) to humans, and economic growth which must in any case finally end (see above), only fools would choose postponing the inevitable necessity of bringing an end to growth at the expense of such vital elements of the natural world, yet the human race has a poor record for making such choices.

g. **Surface water and ground water are, now, and will continue to be vulnerable to pollution and contamination.** (I agree. This is well known, I would say, and not subject to debate.)
NOTES: Natural systems do have surprising resilience in the face of various sorts of contamination. However, it has surely been more than adequately demonstrated that human activities can easily overwhelm that resilience.

h. **Flooding has always posed a threat to human safety and economic enterprise, where humans choose to dwell and conduct their activities in areas subject to flooding.** (I agree)
NOTES: There is, today, more than adequate scientific and technical knowledge to ensure, if there is the will, that humans do not live or conduct their economic activities in areas subject to flooding. It may be that climate change due to human activities will increase the risk of flooding in some areas.

i. **Knowledge about Alberta's water systems and about how to use water wisely is important, NOW, and will be increasingly important in future.** (I agree)

j. **Effective water management will require significant (public) investment in infrastructure (e.g., dams) and the maintenance of that infrastructure.** (I do NOT agree, particularly where the only example given is "dams"!)
NOTES: Instead, truly effective water management requires significant public investment in regulation, guidance/education and, ultimately, restriction of people and corporate entities in their use of water. This management implies the limitation of economic and, finally, population growth in areas where they cannot be supported by local water supplies without damage. Dams are not a legitimate use of public money,

even in cost/benefit terms, when a true accounting of all costs involved is made.

As to private investment, it will go where benefit is seen to those providing the money and it must be carefully regulated and limited by government to prevent results not in the current public interest or in the interest of future Albertans. Investment, private or public, that results in or encourages economic and population growth beyond what natural water supplies can sustain without damage, cannot be justified.

2. The most important challenge with respect to water that the Government of Alberta should address is to acknowledge that we live on a finite planet, with finite water resources, and to work toward development of a healthy social/economic system that can continue indefinitely in a sustainable way, with reduced and, finally, curtailed, growth. In the interim, the Alberta Government should focus on careful regulation, guidance and education to maximize the efficiency of water use, and on local restriction of growth to prevent water demands from exceeding what can be taken from water sources without damage.

(As I am "pushing" the deadline for submitting responses to the workbook, I will submit my responses to Part b as a separate document, according to the book`s format.)

Albert H. Taylor

Albert H. Taylor

9. Barbara Botros Calgary

From: "Anne K. McInerney" <Anne.K.McInerney@gov.ab.ca>
To: "'mailbox@equusgroup.com'" <mailbox@equusgroup.com>
Subject: FW: Water for Life
Date: Tue, 19 Mar 2002 14:13:21 -0700
X-Mailer: Internet Mail Service (5.5.2653.19)

-----Original Message-----
From: Barbara Botros [mailto:bbotro@po-box.mcgill.ca]
Sent: Monday, March 18, 2002 3:57 PM
To: Water For Life
Subject: Water for Life

Hi!

I'm a student at McGill University in Montreal, however was born and raised in Calgary. A friend informed me of this website, and I had a look.

I'd like to add two cents - and this will be brief.

#1 - Protect our future. For all Albertans to come, who treasure our province and its resources, let us protect Alberta the way it is. Give the youth a voice; we're not out of the loop, we just haven't had a chance to express our views.

#2 - Don't sell our water. Although this is not discussed in your website, if reviewing our water strategy in Alberta leaves room for corporations and companies to come in and get involved in the decision-making process, then we are risking much more than if we were not to review policy at all.

#3 - Sustainable Development. I am in Mechanical Engineering, and first and foremost, I believe that any developments such as dams can be sustainable. Research must be made by informed scientists, as well as environmentalists.

Remember, stricter policies on waste management at home, and in industrial areas can save water. Let's look at acting to reduce the use of water, where waste is prominent, and we can get through these times of drought, unless this trend continues due to global warming. But that's a whole other story.

Thanks.

Sincerely,
Barbara

10. Tom Maccagno Lac La Biche

Tom Maccagno
P.O. BOX 1270
LAC LA BICHE, ALBERTA
TOA 2CO

32 650

March 26th, 2002

Equus Consulting Group
Suite 1010, 10050-112 Street
Edmonton, Alberta T5K 2J1

OPEN LETTER

Attention: Jim Gendron

FAX (780) 423-4745

Dear Mr. Gendron:

RE: "Water for Life" Exercise

The "Water for Life" material is not only biased, but potentially inflammatory.

It risks creating in the minds of uninformed Southern Albertans, at the expense of Northern Albertans, that we have a "surplus" or "excess" of water in this region which could be better utilized elsewhere. How tragic. How absurd!

When was the last time Alberta Environment's (AE) supercrats checked our receding lakes and streams, and ground water levels, dried out sloughs, wetlands, water courses and dugouts?

Can there be any doubt that most of the measurable benefits of interbasin schemes invariably occur in the Receiving Basin to the detriment of the Donor Basin?

In any event, I am enclosing a paper which was presented at the NADC, "Water in Northern Alberta" Conference which was held in Grande Prairie in 1987.

What has really changed besides the head of the hydra, otherwise known as AE, which pretends to be the interminable proponent, advocate, judge and jury of water diversion schemes in this Province?

I am also enclosing copies of self explanatory Letters to the Editor which appeared in the Edmonton Journal on December 31st, 2001 and January 21st, 2002.

Furthermore, before Albertans embark on AE's current "Water Conservation Strategy" Exercise, may I respectfully suggest that they should be provided with Report Cards on AE's flawed 1997 "Fish Conservation Strategy" and questionable "Forest Conservation Strategy".

I dare to say, AE has a dismal record when we look at the plight of our beleaguered fisheries, forests and provincial parks, among other things. Some Steward!

Fortunately, AE does not have the final say concerning water diversion schemes. May I remind you that under Canada's Constitution the Federal Government has exclusive jurisdiction over our navigable waterways and fisheries habitat. This is another glaring oversight in the "Water for Life" brochure.

Also, how would a multi BILLION dollar diversion scheme be reconciled with the Fiscal Responsibility Act? Isn't Northern Alberta already the Provincial Cash Cow? The North - South disparity should be narrowed instead of irreversibly widened by a water diversion scheme of an incalculable and unpredictable nature.

Or is this another transparent attempt to once again inflict upon Canadians a favorite ploy the Provincial Government, namely, Ottawa bashing, in order to deflect a potential North - South conflict?

Finally, why does AE ignore world class fresh water scientist, Dr. David Schindler?

Who benefits and who loses from this apparent petulance?

As you know, I do not believe in "sheep runs".

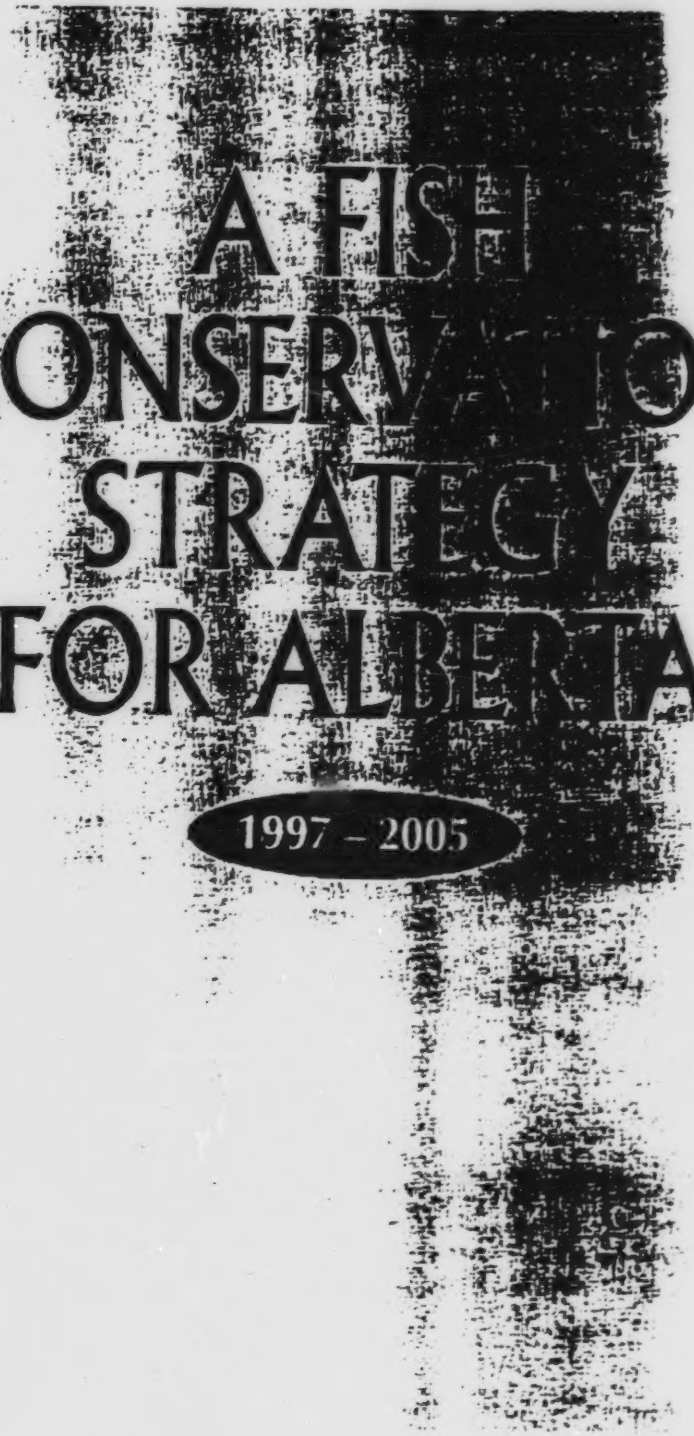
In conclusion, AE would be well advised to ponder on the following words of an Elder, that is to say, "In the end, we will conserve only what we love".

Kindly acknowledge receipt.

Sincerely;

Tom Maccagno
(780)623-4177

c c Premier Ralph Klein
Ray Danyluk, MLA
Lakeland County
Lac La Biche Fisheries Enhancement Group
Federation of Alberta Naturalists
Alberta Commercial Fisherman's Association
Northern Alberta Development Corp.



A FISH CONSERVATION STRATEGY FOR ALBERTA

1997 – 2005

Alberta
ENVIRONMENTAL PROTECTION
Natural Resources

WATER DIVERSION - NORTHERN ALBERTA NIGHTMARE

(Augmentation is an Abomination)

Water diversion appears to be Northern Alberta's modern day Greek mythological hydra monster, which keeps rearing its ugly head from time to time. It seems water diversion schemes are temporarily shelved when conditions are unfavorable but they never appear to die.

And, if dams and diversions are being planned and studied somewhere by someone, the rationale would seem to be dams and diversions will likely be built if the proponents of the plan are persistent, and the public is kept unaware of the ~~damages~~ dangers.

In the mid 1960's the Social Credit Government released a water plan for Alberta's waters. It was labelled PRIME (Prairie River Improvement Management and Evaluation). It was very ambitious. It ultimately proposed diverting water from the Peace, the Athabasca and the North Saskatchewan Rivers, uphill into Southern Alberta, into the Red Deer River, then the South Saskatchewan, Bow River and Oldman River basins for irrigation purposes, future urban water supplies and to dilute pollution.

Fortunately, there was an immediate public outcry which was neatly summed up in the slogan "Prime is a Crime".

When Lougheed came into power in 1971 he promised PRIME would be shelved, but there was another uproar in the early 1980's when the general public once again became aware of apparent discussions by government officials of a scheme to divert water from the Peace River to Southern Alberta.

If our rivers could speak, I am certain they would put the following question, as did the Roman Senate 2,000 years ago, to those Government Officials, Engineers, Planners and Consultants who still advocate water diversion:

"Quosque tandem Catalina abutere patientia nostra,"
that is to say,
"How long, then Catalina will you waste our patience?"

Canadian experience along with the experiences of other countries around the world in connection with dams and diversions have shown they are environmental and often times, social disasters.

Isn't it time we told the responsible authorities of their duty to see what should be obvious, gives the disastrous consequences of such schemes elsewhere? There is no longer any excuse for blundering into the unpredictable, incalculable and irreversible scenario known as water diversion, also known as "inter-basin transfer" and "inter-basin augmentation". Isn't that latter phrase elegant? Who conceives these phrases and soothing euphemisms? Why? If you heard that Alberta Environment had approved the release of "growth enhancing effluent" into your favorite lake or river, which would increase its "productivity level", would you be alarmed? Probably not, until you realized the jargon means the lake or river is about to receive some treated sewage which will yield generous amounts of highly undesirable algae plus alot of hyperactive bullrushes and reeds.

This deadly jargon is oftentimes used to camouflage deadly plans, which in this scenario involve dams and diversions.

Let's not fall victim to the "Boiled Frog Syndrome". Believe it or not, some years ago a Canadian researcher put a frog in a pan of hot water and the frog immediately hopped out. Then the researcher put the frog in a pot of cool water over a low flame. The water and the frog slowly got warmer, and the frog apparently became rather comfortable and lethargic. In fact he boiled to death.

A review of some water diversion projects is now timely. It is interesting to note what happens when engineers and so-called environmental experts dare to play God. Please remember our river basins have evolved over 10,000 years, and we do not have the knowledge to assess and predict all of the changes which result from water diversion schemes. This is now undeniable.

> "Hydroelectric developments usually are accompanied by deleterious environmental effects. The alteration of river flows and capture of their hydraulic energies profoundly affect the aquatic ecosystems and landscape forms involved. Because each drainage basin has evolved it's present form over thousands of years, a major alteration of flow in one branch removes part of the energy that maintains river form and forces the landscape to evolve into a new configuration. In turn, biological communities must adjust to the evolving landscape. We will describe typical environmental disruptions that result."
>
> "Water flowing unimpeded to the sea is far from being wasted. In the case of north-temperate rivers, natural seasonal runoff patterns heavily influence downstream deltaic, estuarine and coastal environments, and modification of this runoff by interbasin water diversion and storage for power production can have severe impacts (e.g. Townsend 1975; Berks 1981; Neu 1982a, 1982b). Thus, the deleterious consequences of extensive hydroelectric development in a watershed also can extend to areas thousands of kilometres away."[1]
>
> "However, schemes to redistribute water on a massive scale may pose the most serious threat to the environment in the future. For example, Canadian water for export to the United States may become a bargaining item in free-trade negotiations between the two countries (Hall 1985; Reisman 1985)."[2]

1. The Rawson Academy of Aquatic Sciences 1987
2. The Rawson Academy of Aquatic Sciences - 1987

> "Our ability to predict and assess the environmental effects of single impoundments is progressing. This is less so for complex schemes involving several impoundments, but the knowledge and experience to deal with major water redistribution schemes is almost nonexistent."[3]

A major diversion affecting the Mackenzie basin could also trigger unfavourable climatic changes. Especially if the U.S.S.R. also dabbled with its drainage patterns. An examination of some diversions and dams with some of their unpredicted environmental consequences are as follows:

1. The Churchill-Nelson River diversion in Manitoba;
2. The James Bay (La Grande Complex-Phase 1) power project in Quebec;
3. The Churchill Falls power project in Labrador;
4. The Bennett Dam project;
5. Proposed megaproject diversions in the U.S.S.R. from the Arctic drainage to the Volga River and Central Asia;
6. The Aswan Dam, Egypt;
7. The Garrison Dam project, United States of America;

We can't afford to continue experimenting with our rivers. Furthermore, how many dams have truly deserved the tremendous amounts of money poured into them? The Aswan Dam is not the only colossal disaster.

Before we consider going financially and environmentally deeper into the hole in Alberta with a misguided megaproject we should also consider that the consequences of "inter basin augmentation", especially in Alberta, are unknown for these reasons:

> "To be more specific, existing Canadian transfers do not have a north-south orientation, do not divert from better-watered to drier regions, nor from less- to more- populated regions, nor have they been attended by interjurisdictional conflict. The pattern to date is uniquely Canadian, not the first stages of a pipeline leading south of the border"[4]

It should also be noted designs based on historical climate and water data will not give an accurate prediction for the future which apparently promises major climatic change because of the "greenhouse effect".

Furthermore, diversion schemes could have a very negative impact on future economic development projects and job prospects in Northern Alberta.

---

[3] The Rawson Academy of Aquatic Sciences - 1987

[4] Interbasin Diversions and Their Implications - Frank Quinn, Environment Canada - June, 1987

However, it is not enough to simply oppose water diversions. We must also look at alternatives for Southern Alberta which will increase efficiency, promote conservation, and discourage waste in their irrigation and water distribution systems.

> "With increasing population and economic growth, Alberta will need to heed the examples of the increasing attention being placed on water reuse in the rest of the world. As water supply constraints become evident, it will become even more important to remove some of the artificial constraints to increased water reuse. Attention to these considerations should rate a much higher priority than consideration of interbasin water transfer as a means to deal with water shortages."[5]

Water diversion would clearly be a strong disincentive to efficient water use and improved waste water treatment. Israel apparently achieves as high as 98% efficiency in its irrigation systems. The Lethbridge Northern Irrigation District apparently only achieves 30-35%.

What are we doing to really come to grips with the growing problem of soil salinization? What about more research into more drought resistant crops, and markets for them? Shouldn't we invest more in improved moisture-conserving dryland farming techniques and innovative technology?

If $400,000,000.00 is the estimated cost of the highly controversial Oldman River Dam, what would be the real cost of a North - South diversion scheme involving several river basins, settlement patterns, agricultural lands, forested and recreational areas, fishery resources and an elevation difference of 1,500 ft. between the lower Peace - Athabasca Country and the higher Oldman River Basin?

Isn't it time we reflect upon the wisdom of the Indian Chief, Seattle:

"Man did not weave the web of life.
He is merely a strand of it.
Whatever he does to the web,
He does to Himself."

And shouldn't we admonish our political leaders:

> "Where there is nothing to obstruct the vision and there is a duty to look, it is negligence not to see what is clearly visble."[6]

Worldwide experiences with diversion schemes now conclusively demonstrate that they are totally unacceptable in Alberta, and elsewhere. A clear and unequivocal rejection of provincial

---

5. Prairie Forum, Vol. 7, No. 1, Spring, 1982 Advances in Water Reuse - Steve E. Hrudey

6. Swartz Bros. Ltd. et al v. Wills [1935] 3 D.L.R. 277

inter basin transfer schemes and water export proposals is now mandatory. Our birthright is not for sale. Nothing less will suffice.

We should learn to live with our environment. We accept the sunshine available to us. Why can't we accept the available water?

Augmentation is an abomination.

T. MACCAGNO
LAC LA BICHE, ALBERTA

NOVEMBER 5th, 1987

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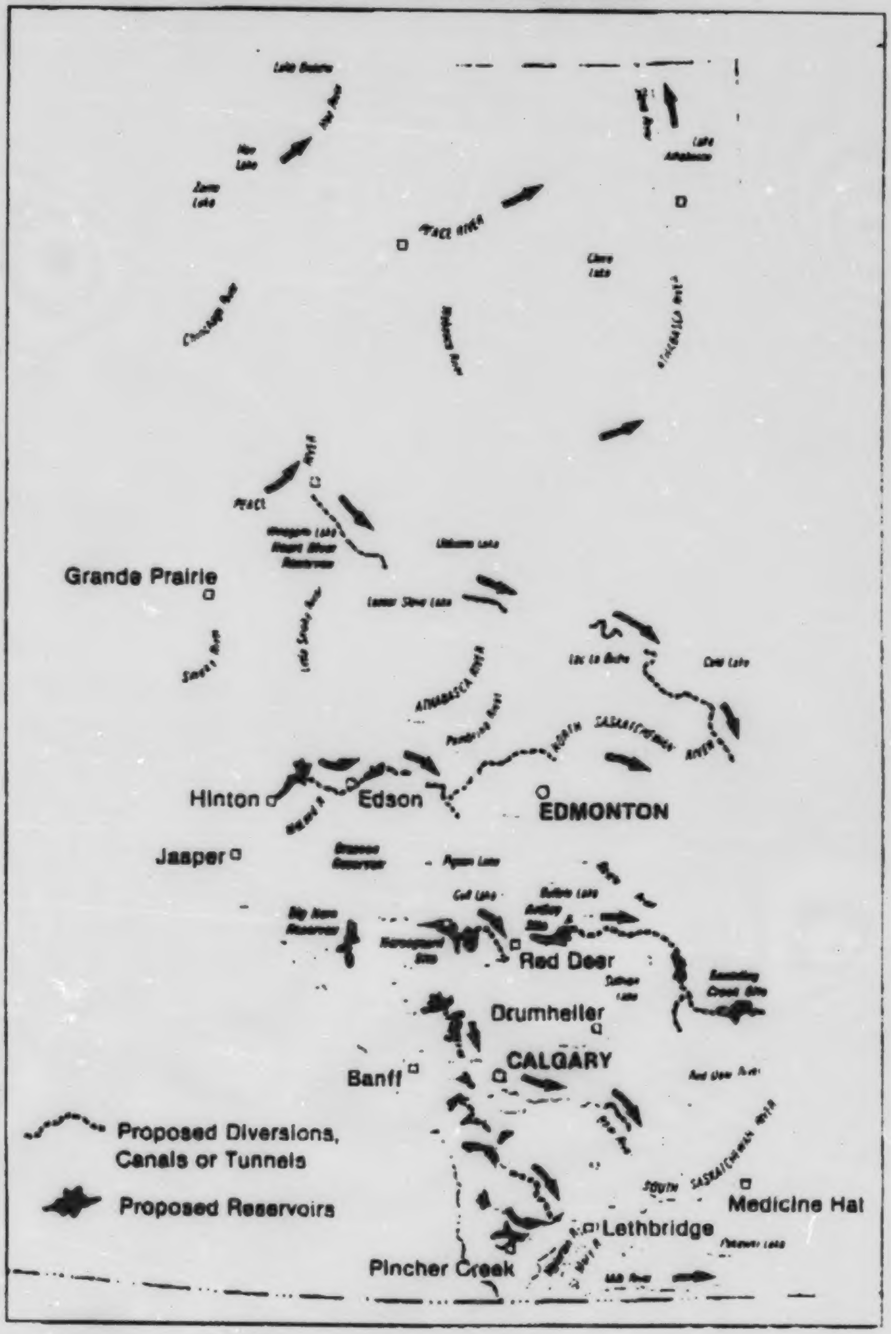
Figure 3. Water Transfers Envisioned Under the Prime Scheme, Alberta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Athabasca River
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Lac la Biche
Cold Lake
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North Saskatchewan River
Hinton
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EDMONTON
Jasper
Pigeon Lake
Gull Lake
Buffalo Lake
Red Deer
Drumheller
CALGARY
Banff
Red Deer River
South Saskatchewan River
Medicine Hat
Lethbridge
Pincher Creek
Proposed Diversions, Canals or Tunnels
Proposed Reservoirs

EDMONTON JOURNAL – December 31, 2001

Catastrophe looms when we meddle with our rivers

Over 150 years ago, Canada's greatest explorer and geographer, David Thompson, commented: "I have always admired the formation of the rivers as directed by the finger of God for the most benevolent purposes."

In 1931 Mr. Justice Holmes of the United States Supreme Court stated that "A river is more than an amenity, it is a treasure."

Shouldn't treasures formed by the "finger of God," be respected and properly cared for?

Shortsighted southern Alberta politicians lusting for northern Alberta's also-receding water should reflect on the wisdom of Thompson and Holmes as they stand on the retreating banks of the Aral Sea in Uzbekistan, the location of one of the world's greatest environmental disasters.

The Aral Sea catastrophe resulted from the former Soviet government attempting to play God by diverting waters which were being "wasted" flowing into the Arctic Ocean and diverting them into, for example, massive cotton growing projects.

An Alberta delegation could also make inquiries about soil salinity. Apparently, the cotton grew well only for a relatively short period. In the meantime, a major fishing industry collapsed and new human health problems "inexplicably" appeared.

It is also interesting to note that Alberta Environment Minister Lorne Taylor has apparently conveniently overlooked the provisions of Alberta's Water Act which state: "a licence shall not be issued that authorizes the transfer of water between major river basins of the Province unless ... specifically authorized by a special Act of the Legislature." And "Before a Bill to amend section 46 & 47 or to enact a special Act described in those sections is introduced into the Legislature Assembly, the Minister must consult with the public, in a form and manner satisfactory to the Minister, with respect to such a Bill."

When does Taylor propose to introduce a bill repealing this legislation or setting out the rules for only genuine public hearings?

> Are Taylor and his cohorts and toadies prepared to deny that most of any measurable benefits of interbasin schemes usually occur in the receiving basin to the detriment of the donor basin?

Large engineering firms are no doubt once again dusting off plans for water diversion schemes which have been kicking around since the mid-1960s, when the provincial government introduced PRIME (Prairie River Improvement Management and Evaluation). Have Albertans already forgotten the cost of the Oldman River Dam?

Why doesn't Taylor inform Albertans about the "minor" interbasin transfer arising from a questionable fish-stocking program which introduced the fish tapeworm parasite into some southern Alberta reservoirs?

And what can we expect from the two toothless giants, Alberta Environment and Environment Canada, who were both exposed in the expediency-ridden pseudo-environment assessments concerning the Oldman River Project and the Alpac Project? Have we forgotten the impact on our forests was excluded from the latter so-called public review?

Are Taylor and his cohorts and toadies prepared to deny that most of any measurable benefits of interbasin schemes usually occur in the receiving basin to the detriment of the donor basin?

Albertans would do well to reflect on the following observation by Jack Glenn in *Once Upon An Oldman*:

"We learned that greed and avarice are nothing to be ashamed of and that, as always, the squeaky wheels, if they are sufficiently concentrated to represent a significant voting bloc, will get the grease. We learned that politicians and bureaucrats, federal and provincial, can break the rules, misuse the system and manage information to their advantage without the risk of serious repercussions."

An appropriate New Year's resolution for Albertans would be to object to this recurring stupidity, and to remember that the decisions we make now are not only for our perceived short-term benefits, but also for heritage treasures we are obligated to pass on to our children.

We must remember the children, otherwise they may also damn us!

Tom Maccagno, Lac La Biche

An Afghan farmer harvests

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For the United States,
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dollar tobacco and alc
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ment should start their
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Heroin is akin to
terms of addiction
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With silver tongues and slick duds they fooled many a voter that their ideas would lead to a

and then one by one the folks from each province were led along that same dusty old trail.

Desert air reeks of death. Unless, of course, you have gold.

***Barbara Hagensen**, Edmonton*

been bom

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Grandiose plans to divert water reward South

Proposal an example of behind-the-times Tory attitudes

My compliments on your recent articles regarding the Meridian Dam proposed for the South Saskatchewan River and the larger PRIME framework in which this proposed mega project will fit into — the water relocation scheme which never dies "Is Alberta ready for PRIME time?" *Journal*, Jan. 13).

It's about time that people in *The Journal's* readership knew more about the grandiose and quixotic schemes this government is proposing for its perceived power base — southern Alberta and its shrinking agricultural population.

Do we need another gigantic water diversion project?

Are we going to let another Oldman River Dam get built for even fewer reasons than were presented during that bizarre development?

And by the way, one of the major reasons for building the Oldman Dam was supposed to be flood control.

As I recall, there was a major flood the dam was unable to prevent in 1996 which wiped out a good portion of Fort Macleod and Pincher Creek, the very communities which were supposed to be protected by this $1-billion investment.

I am appalled at Environment Minister Lorne Taylor's arrogance and ignorance in floating the water diversion balloon again.

What new environmental disaster is he trying to hide? Or perversely, what does he really want to say?

That we have voted in a government that thinks 40-year-old ideas are new and exciting?

That we live in a vast wilderness which needs taming?

That farming is the only industry outside of oil and gas that is significant to the Alberta government?

Or, that water is just another exploitable renewable resource?

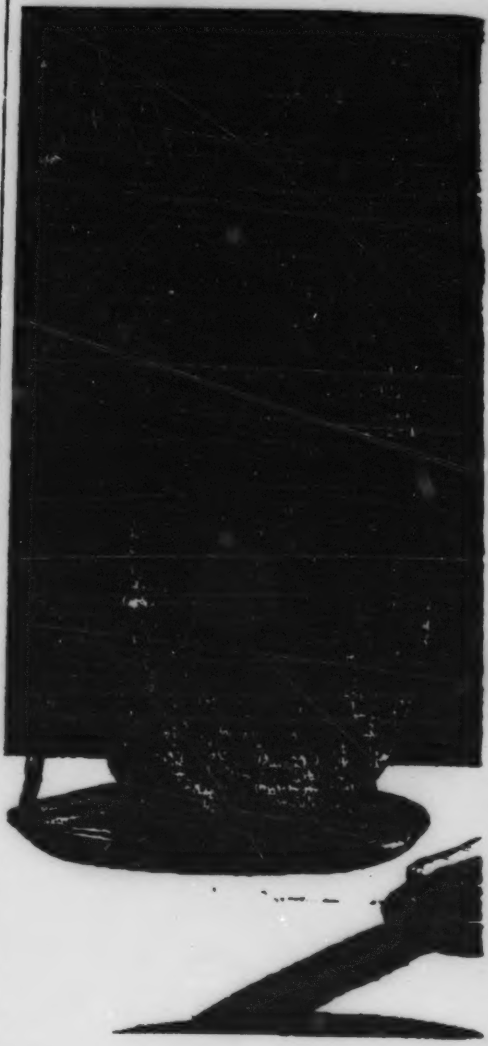
Finally, I know this is probably a big secret, but guess where the minister of the environment actually gets elected? Surprise, it's the Cypress/Medicine Hat constituency.

Could that be anywhere near the proposed Meridian Dam? And while we're on the topic, is it a coincidence that the Minister of Agriculture, Shirley McClellan comes from the Drumheller/Chinook constituency?

I guess their constituents are pretty important. But hey, these are prominent cabinet ministers. We'll just have to trust them when they tell us that they genuinely have the interests of all Albertans in mind when making mega project decisions for their neighbourhoods.

But hey, I'm just from Edmonton. What do I know and who cares anyway?

***Helen Follmann**, Edmonton*



Funds wasted could save car

If a presumably intelligent person is elected as an MP to legislate and serve Canada in the best manner possible, why would he or she then proceed to spend between $1 billion to $2 billion on an anti-gun campaign to prevent 234 gun deaths per year while ignoring other enormous causes of fatalities?

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HOCKEY VIOLENCE

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Provisions were here re-enacted and made applicable in Terms to the respective Provinces and the Legislatures thereof, with the Substitution of the Lieutenant Governor of the Province for the Governor General, of the Governor General for the Queen and for a Secretary of State, of One Year for Two Years, and of the Province for Canada.

VI. -- DISTRIBUTION OF LEGISLATIVE POWERS.

Powers of the Parliament.

Legislative Authority of Parliament of Canada.

91. It shall be lawful for the Queen, by and with the Advice and Consent of the Senate and House of Commons, to make Laws for the Peace, Order, and good Government of Canada, in relation to all Matters not coming within the Classes of Subjects by this Act assigned exclusively to the Legislatures of the Provinces; and for greater Certainty, but not so as to restrict the Generality of the foregoing Terms of this Section, it is hereby declared that (notwithstanding anything in this Act) the exclusive Legislative Authority of the Parliament of Canada extends to all Matters coming within the Classes of Subjects next hereinafter enumerated; that is to say, —

1. Repealed.(44)
1A. The Public Debt and Property.(45)
2. The Regulation of Trade and Commerce.

---

(44) Class 1 was added by the *British North America (No. 2) Act, 1949*, 13 Geo. VI, c. 8 (U.K.) That Act and class 1 were repealed by the *Constitution Act, 1982*. The matters referred to in class 1 are provided for in subsection 4(2) and Part V of the *Constitution Act, 1982*. As enacted, class 1 read as follows:

> 1. The amendment from time to time of the Constitution of Canada, except as regards matters coming within the classes of subjects by this Act assigned exclusively to the Legislatures of the provinces, or as regards rights or privileges by this or any other Constitutional Act granted or secured to the Legislature or the Government of a province, or to any class of persons with respect to schools or as regards the use of the English or the French language or as regards the requirements that there shall be a session of the Parliament of Canada at least once each year, and that no House of Commons shall continue for more than five years from the day of the return of the Writs for choosing the House: provided, however, that a House of Commons may in time of real or apprehended war, invasion or insurrection be continued by the Parliament of Canada if such continuation is not opposed by the votes of more than one-third of the members of such House

(45) Re-numbered by the *British North America (No. 2) Act, 1949*.

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Legislative Authority of Parliament of Canada

2A. Unemployment insurance.(46)
3. The raising of Money by any Mode or System of Taxation.
4. The borrowing of Money on the Public Credit.
5. Postal Service.
6. The Census and Statistics.
7. Militia, Military and Naval Service, and Defence.
8. The fixing of and providing for the Salaries and Allowances of Civil and other Officers of the Government of Canada.
9. Beacons, Buoys, Lighthouses, and Sable Island.
* 10. Navigation and Shipping.
11. Quarantine and the Establishment and Maintenance of Marine Hospitals.
* 12. Sea Coast and Inland Fisheries.
13. Ferries between a Province and any British or Foreign Country or between Two Provinces.
14. Currency and Coinage.
15. Banking, Incorporation of Banks, and the Issue of Paper Money.
16. Savings Banks.
17. Weights and Measures.
18. Bills of Exchange and Promissory Notes.
19. Interest.
20. Legal Tender.
21. Bankruptcy and Insolvency.
22. Patents of Invention and Discovery.
23. Copyrights.
24. Indians, and Lands reserved for the Indians.
25. Naturalization and Aliens.
26. Marriage and Divorce.
27. The Criminal Law, except the Constitution of Courts of Criminal Jurisdiction, but including the Procedure in Criminal Matters.
28. The Establishment, Maintenance, and Management of Penitentiaries.
29. Such Classes of Subjects as are expressly excepted in the Enumeration of the Classes of Subjects by this Act assigned exclusively to the Legislatures of the Provinces.

---

(46) Added by the *Constitution Act, 1940*, 3-4 Geo. VI, c. 36 (U.K.)

11. Florence and Raymond Knight Calgary

2416 Ulrich Road N.W.
Calgary, AB T2N 4G5
April 24, 2002

Alberta Environment,
9th Flr. Oxbridge Place,
9820 - 106 Street,
Edmonton, AB T5K 2J6
FAX: 780-422-0262
Attn: Ian Rudland

Dear Sir:

Re: Water Conservation

On behalf of my husband and myself, I wish to give you our ideas how Alberta residents can assist in the conservation of our water resource.

We have been in our present home for the past eight years, and when we purchased this home, we felt the huge poplar trees were a detriment to our yard as well as tp the environment. The roots of the poplars were growing at the surface of the ground, making mowing the lawn impossible and leaves in the Fall would fill up bags of garbage for the landfill, also we did not wish to use chemicals on the dandelions.

We decided to remove the Poplar trees and replace them with evergreems, we also removed the grass and landscaped our front and back yards with paving stones which no longer required watering or the use of chemicals. We arranged oval areas in our yard for the trees and when the trees get watered or the runoff from the roof, the water dces not get away into the gutter. We call this Arizona landscaping and we love it!

We are of the opinion that people should be encouraged to instal Arizona landscaping on their properties which would help to conserve water, reduce plastic bags of grass going to the landfill and the use of chemicals to kill dandelions. Today people are not growing gardens, they grow grass. Water meters are not the answer!

Thanking you for your consideration and for forwarding this letter to the right person at Alberta Environment.

Sincerely,

Florence and Raymond Knight

/f

12. Richard Clark Medicine Hat

Brenda Matthews

From: Cypress MedicineHat
Sent: Thursday, April 11, 2002 9:11 AM
To: Brenda Matthews
Subject: Fwd: Wate pricing

AR ACK Dept.
APR 2002

>>> <Richard_Clark@murphyoilcorp.com> 04/10/02 02:06PM >>>
PERSONAL OPINION

Mr. Taylor.
Last evening I attended an Alberta Env open house on water.
Following that, I would express the opinion - do NOT put a price on water. As a valued commodity, it can then be traded. My understanding is that once the selling of water has started, it will be impossible to reverse the trend. Agreements to sell and NAFTA appear to be one way streets.

The issue is very complex. Suggest conserving or reducing use within our boundaries before selling.

From the AE info book, municipalities consume 5% and irrigation 71%. It seems a reduction in irrigation can support municpalities.
Question form the meeting: By continuing irrigation, are we supporting an artificial economy?
Can water be applied more directly to the crop?

A tough challenge .
Good luck..........

RECEIVED
Client Relations Unit
Alberta Environment
APR 2002
AR # 3703
File #

Robert Harrison

13. Denice Stewart

om: Denice Stewart [safetycodes@mdfoothills.com]
ent: Monday, April 01, 2002 2:29 PM
To: Riva Cambrin, Harry
Cc: Robert Harrison
Subject: Water for Life Workshop

Notes from March 27, 2002 Water for Life Workshop

There was representation from Okotoks, Turner Valley, Black Diamond and the MD at the workshop.

The group went through Part A of the workbook and had the following comments:
all parties agreed that the quality of water has decreased, concerns regarding the export of water, and global changes increasing the rate of evaporation and that protection of the quality of water was important;
Facilitator asked group which persons where personally responsible for own water supply vs. distribution systems; towns on distribution and MD on personal supply; group agreed Walkerton was due to human error; North Battleford - Ag user?
Manage water availability a priority; changing technology to take greater advantage of grey water;
Area is in Palliser Triangle and currently in draught cycle; if considering global perspective over past 1000 years then change is inevitable;
Oil and gas exploration is largest user of water supply in north province where wetlands are plentiful; largest user in south is Ag users where surface water is in short supply;
istorically sub-division occurs on non-agriculture productive lands and parian areas, (river banks, low lying sloughs, etc);
n times of draught - dilution is the solution to pollution theory is not applicable;
This is a given (North Battleford) feedlots, industry, recreation on water courses;
Group discussed compliance versus education; compliance monitoring of existing operations, review of new and existing licenses; education in school rooms;
Re: dams - get off the pot and make a decision and move forward; if effective water management there would be no need for dams; infrastructure required a solution to existing generous licensing; lack of enforcement and compliance monitoring; balance between ag users and consumers of ag products; first on last off policy regarding water rights; surface water (irrigation draw) returns to ground water source; irrigation timing / di stribution timing/ when ag users permitted to draw - not permitting PM watering (conditions requiring drawing X volume may require am and PM watering); waste of watering in high winds (when are the winds not high in south of High River and Southern Alberta; power is the highest irrigation expense therefore discouraging excessive watering; excessive watering not a economic advantage to irrigators resulting in rot and reduced production quality; lawn watering versus crop watering; increase water management orders under the Water Act - last year there was) water management orders issued by AE; no license is a right (volume permitted per household); wasting water is not a right; need to achieve a balance between rural household versus urban household in volume permitted; Water Act - 3 users - household users, traditional ag users and licensed users.

Page 9 Discussion
ovincial plumbing code does not address low flow devices to encourage nservation;
harge for license and a renewal fee then licenses held by non-users will drop off the user list;
Establish a conservation credit - Eco-friendly credit;
Ornamental ponds not a priority for water use sources.

P.O. Box 2107
Cochrane AB
T4C 1B8

14. Marilyn Unger **Cochrane**

Equus Consulting Group
250 - 9707 110 St NW
Edmonton AB
T5K 2Z9

To whom it may concern:

Kindly accept my comments (in non-standard form) and integrate them into your final report.

While I had access to my computer before travelling, I drafted up notes but I was not able to finalize (or prettify) them - as you can see.

Thank you again for this opportunity and for your efforts in making all of us aware of a worsening situation for which we all are responsible. I feel the main objective should be to inform, educate and to make all users of our water resources accountable - with no exceptions or privileged groups, outside of identified emergency, life-sustaining situations.

Yours sincerely,

M. A. Unger

Water for Life - seeking fresh ideas.

I am pleased that you are searching for the thouoghts and ideas of residents of Alberta to plan for the future of Alberta's water.
I have studied the documents and the questions and am pleased for this opportunity. I found it difficult to follow and answer the questions, but this is a rich source of interest and information and is a valuable exercise, but perhaps not in this form.
On page 1, para 3 I think the opportunities for meaningful participation are limited limited. Only large urban centres and medium cities represent vast areas are and there was little timely notification forthe meetings, with insufficient preparation in Calgary, for example, so that large numbers had to be turned away. If only minimal numbers of interested parties can participate, the study cannot genuinely reflect the views of the people. This study seems to be the basis for decision-making for the next 50 years - surely we will have more occasions to change direction in that time ?
Education and sensitizing the general public effectively is vital. This is an issue with enormous consequences for all of us. Short-sighted, self- or community-centered planning by the uninformed will have terrible ramifications for the future of all people living in the area or downstream.
In trying to answer part a (page 2), I felt that this section is not very useful. You are asking people for opinions, but only of the "crystal ball" variety. Crunching numbers from this kind of collected information cannot be valid research, as no one can know the answers to any of these.
If the wording was oriented to the present rather that future time, I would feel more confident that such a study of people's viewpoints would be useful.
Question "f" is a leading question.
We know that a,b,e,g,h and i are already happening, so I don't understand why these questions are being posed.
Question "j" is missing the essential idea of "monitoring". By examining present water use; by education; by thoughtful presentation of carrots and sticks, I feel that water supply and water usage will be effectively managed. I don't like to go immediately to the huge costs of "infrastructure" before examining the changes that people can actively make in daily life. By educating all consumers, public and industrial, and by motivating them to review their use of water in a comprehensive way great gains could be made.
I like the objectives that the "ideas" group came up with. I would include the idea of our need to protect our sources of water in catchment areas; by forestry practices; by monitoring industrial and agricultural used of "pure" water . Consumers should also be part of the solution. Creative ways can be found to

give incentives of recognition, useful rebates, trading of allotments so that all participate actively and positively.

Part b - page 3
Question 5 - no
Question 6 I think that this is a shared responsibility, but that the government should fund research to produce simple, effective kits and make them widely available at a reasonable price. Supply systems should be largely funded by government depending on cost, but with individuals communities making some relative / reasonably nominal contributions.
Question 8 - Government officials must be available for consultation and be responsible for seeing that ground water contamination from industry and agriculture is monitored and rectified before water is returned to the supply system.
I think there should be less emphasis on who pays, but rather on who is accountable. For long term improvement, education, follow-up and training of staff to monitor and regulate abuses to the system, should be priorities.
Question 9 - I prefer that the government continue to oversee water supply .

Allocation - page 6
I am shocked at the irresponsibility of the idea "first in time". This may have been possible a century ago when we didn't value this precious resource and our ancestors may have wasted it. With a huge population of people and animals and many industries presently dependent on water supply, this is an indulgence we can no longer tolerate. All licenses should be issued according to availability and by proven responsible management of water resources.
The equation that water is allocated for aquatic, environment, then apportionment agreements and the REMAINDER used for - firstly for the economy and lastly for human use is intolerable. Sustaining living things and the environment should be first in your equation.
The government must announce a commitment to revise their allocation policy immediately.

I must quibble about the format of this questionaire on page 7. It is preferable to number or letter each of these questions.
In reference to #6 - allowing water transfers - this is already being done, so why include this question?

Page 9

Page 9

Water pricing - Price should be determined by the cleanliness and volume of water returned by the municcipality, by business or agroindustry to the system. There should be treshholds of use with increments not gradual but by 5 fold or 10 fold increase ~~on~~ above the base Rate for excessive use. We should try to restore our wetlands and not allow access to the watersheds.

I appreciate this opportunity to share my opinions.

Thank~~y~~ you.

Yours sincerely,

Marilyn A. Unger

Marilyn A. Unger

safeguarding alberta's healthy ecosystems

Healthy aquatic ecosystems are integral to Alberta's water resources. As the province's economy and population grows, aquatic ecosystems are affected as we allocate water from natural sources to human uses. Aquatic ecosystems are also affected by changes in water quality that result from human use. The Government of Alberta adopts international quality standards and monitors some portions of aquatic systems to ensure they are not being damaged by human use.

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional options in the space provided.

Options for Protecting Aquatic Ecosystems	Considerations, Possible Implications	Disagree				Agree
1 Determine how much water the aquatic environment requires to remain healthy	Without this information it is difficult to allocate water without putting the aquatic environment at risk. It is difficult to accurately quantify and protect "natural demand"	1	2	3	4	5
2 Determine the balance between the amount of water needed for the ① aquatic environment and the amount ③ needed for economic growth within a water basin ① human use	This is generally done within a water management plan that balances the values of society. These values may change over time	1	2	3	4	[✓ 5]
3 Determine the range of maximum amounts of substances (e.g. phosphates) a river or lake can accept without causing it harm and aim for lower end discharge of these pollutants which endanger river creatures + their food sources	Both point (pipe discharge) and non-point (runoff from land) sources of substances need to be identified and monitored. Non-point sources are difficult to measure	1	2	3	4	[✓ 5]
4 Identify sensitive aquatic environments or habitats that require additional protection Mainly avoid watersheds. sources and fragile environments.	Without this information it is difficult to make management decisions putting the aquatic environment at risk	1	2	3	4	[✓ 5]
5 Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management	The activities that occur in a watershed, along with our decisions on land use, can affect aquatic systems	1	2	3	4	[✓ 5]

Often studies are delaying tactics and are rarely implement. by governme I think it is more importa to work with present cond. to improve them and prepare to respond to future deterioration water quality

I am afraid that this study may end up being just a public relation strategy so the people th[illegible]ke somethi[illegible] being done whereas someth SUBSTANTIAL: more active should be happening for all our sakes.

		Disagree			Agree	
Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use and waste	Economic development opportunities may be lost to achieve environmental protection	1	2	3	4	[✓ 5]
		1	2	3	4	5
		1	2	3	4	5

additional comments

Please feel free to submit any additional thoughts or ideas you may have.

respondent information

The final questions are for our statistical calculations only.

1. Where do you live? *(please check one and provide name)*

○ City

● Town

○ Village, Hamlet

○ Rural Resident (provide name of nearest community)

○ Metis Settlement

○ Indian Reserve

○ Other

2. What is your postal code? T4C 1B8

3. Are you answering this questionnaire as...

● A private citizen

○ A group or organization *(please name the group)*

○ A local government *(please name the community)*

○ A private company *(please name the company)*

○ Other

If you have answered this work book on behalf of a group, local government or company, please feel free to complete an additional work book as a private citizen.

4. If you would like to be added to Alberta Environment's mailing list, please submit your name and address. (optional)

Please return work book in the envelope provided by **April 15, 2002**. Work book is also available on-line at *www.waterforlife.gov.ab.ca.*

15. Dr. June Donaldson Calgary

Brenda Harris

RECEIVED
Client Relations Unit
Alberta Environment
APR 8 - 2002
AR#. 3655
File #

From: Dr. June Donaldson [jad@emotionalsmarts.com]
Sent: Friday, April 05, 2002 9:30 AM
To: Lorne Taylor
Cc: Roger Palmer
Subject: Waterforlife Program - Comments for your review

I learned of the "Waterforlife" program yesterday and I am delighted to see this initiative to protect our water. If I can be of assistance in any way, I would be pleased to participate. In spite of my delight in seeing the material in print, I do have some concerns I would like to share with you.

First, I have a vested interest in this initiative because I live in a waterfront community called Marina Bay in Sylvan Lake. Over the past few years, both as a private individual and as a Board Member of the Marina Bay Board, I have been very troubled to see environmental reserve development take place in Marina Bay - an area designated as a Northern Pike Fish Habitat and spawning area. Environmental reserve development has been on the increase (and perhaps in other areas as well) and it is appears that while there are many people involved with environmental issues there is no one (or two, or three) people that have authority and responsibility to make a decisive, timely, publicized, and significant action to address non-compliant property owner violations and ensure property is restored to its original state with no further damage to the area and surrounding area.

Just now, in fact, tomorrow April 6, 2002, after about six months of the Marina Bay Board attempting to have the Town of Sylvan Council take a stand on environmental reserve protection, the Town is holding an information session at 10:00 a.m. in the Community Centre to gather ideas on what people would like to have done with the environmental reserve.

I don't understand this logic. In my view, it is not up to property owners (many of whom have developed the environmental reserve, or would like to develop the environmental reserve as their own private boat docking and/or swimming area) to decide what should be done with Alberta Environment and Town managed environmental reserve land.

In my efforts to learn more about the various government mandates and who has jurisdiction for what, I have been struck by the number of people and departments involved in various aspects of water, bed, banks, fish habitat and environmental protection, and yet the inability to reach one person who has the responsibility to implement an enforcement action, complete with penalties if necessary, to protect these areas. Why, on such a huge issue as the environmental reserve, are there so many people involved with such limited enforcement and penalty power?

Next, has Alberta Environment ever considered creating a "one-stop shopping and learning" department where all environmental issues are addressed by one department? It seems to me that managing the environmental protection process, keeping those with a "need to know" informed, making decisions, and enforcing those decisions would be more time, money, and resource efficient with a consolidated infrastructure? Would it be possible for Fisheries and Oceans and Alberta Environment to "partner" in their mandates to make this happen?

Last, with "good" water being such a critical and scarce resource, why has Alberta Environment given environmental reserve responsibility and enforcement to municipalities (some of whom are operating with limited resources, peoplepower, business acumen, and environmental awareness) instead of staying in control of this critically important resource?

I have heard people say that Government does not want to be heavy handed and that they want to educate and facilitate change and environmental awareness. I appreciate that perspective, however, most people need to know what the expectations are, where the boundaries are, what will happen if the expectations are ignored and the boundaries are crossed. I suggest that most people don't have any idea as to how fragile the water situation is in Canada, never mind, their role in protecting it. In my experience, when the rules aren't clear, people tend to make up their own rules, and when that happens self-servedness takes on a life of its own.

In closing, I have met some excellent and caring people involved with environment. I must acknowledge David

Lloyd as he took the initiative to come to Marina Bay and see first hand environmental reserve development. Marcie Penney-Ferguson and her associate Michelle with Fisheries and Oceans did the same. Unfortunately, these people can only do so much but their interest and efforts were appreciated.

Thank you for reading this e-mail. I hope these comments provide some ideas on how to maximize existing resources; raise the bar on environmental awareness, protection and enforcement; and streamline services so water can be protected even more than it is at the present time. Good luck with your endeavour.

Sincerely
Dr. June Donaldson (MBA, EdD, Certified Mediator, Arbitrator Candidate)
Donaldson & Associates, Inc., 499 - 1919 B - 4th Street. S.W., Calgary, Alberta,
Canada. T2S 1W4. Telephone: 403 - 287 - 2244. FAX: 403 - 287 - 1212
E-mail: jad@emotionalsmarts.com www.emotionalsmarts.com

16. Dr. Dan Stevelman

X-NAV-TimeoutProtection0: X
X-NAV-TimeoutProtection1: X
X-NAV-TimeoutProtection2: X
X-NAV-TimeoutProtection3: X
X-NAV-TimeoutProtection4: X
X-NAV-TimeoutProtection5: X
X-NAV-TimeoutProtection6: X
From: "Anne K. McInerney" <Anne.K.McInerney@gov.ab.ca>
To: "'mcmillan@equusgroup.com'" <mcmillan@equusgroup.com>, Robert Harrison <Robert.Harrison@gov.ab.ca>, Ralph Schroth <Ralph.Schroth@gov.ab.ca>, Neil Chymko <Neil.Chymko@gov.ab.ca>, Bev Yee <Bev.Yee@gov.ab.ca>, Justin Toner <Justin.Toner@gov.ab.ca>, "'cbrandon@equusgroup.com'" <cbrandon@equusgroup.com>
Subject: FW: Comments on Water Strategy
Date: Fri, 1 Mar 2002 11:49:07 -0700
X-Mailer: Internet Mail Service (5.5.2653.19)

Please treat as official public input...

> -----Original Message-----
> From: Mark Cooper
> Sent: Friday, March 01, 2002 11:34 AM
> To: Anne K. McInerney
> Subject: FW: Comments on Water Strategy
>
>
> FYI
> -----Original Message-----
> From: Brenda Harris
> Sent: Friday, March 01, 2002 10:52 AM
> To: Mark Cooper
> Subject: Comments on Water Strategy
>
> Took a call from Dr. Dan Stevelman, (403-271-0134), Medical Economist, who
> heard Lorne on the news yesterday and wanted to express his thoughts.
> His concern is the conservation of water - Calgary residents are not
> required to have water meters and he feels those that don't (they pay a
> flat rate depending on the size of their property) use twice as much water
> as those who choose to use meters.
> He suggests the government legislate meter usage in order to provide some
> form of control and thereby aid in the conservation of our valuable
> resource.
> He compared it to allowing people to choose whether they wanted to pay by
> meter or flat rate for their car fuel and guess what most would use.
> Nice fellow!
>
> Brenda Harris
> Administrative Assistant to
> Minister of Environment
> 423 Legislature Building
> Edmonton, AB T5K 2B6
> Phone: 427-2391
> Fax: 422-6259
> brenda.harris@gov.ab.ca
>
>

17. Thomas Vladut

-----Original Message-----
From: Thomas Vladut [SMTP:retom@cadvision.com]
<mailto:[SMTP:retom@cadvision.com]>
Sent: Tuesday, April 16, 2002 7:22 AM
To: Information Centre
Subject: water for life

ilto:env infocent@gov.ab.ca <mailto:env_infocent@gov.ab.ca> >

se redirect to the water for life team

thanks

Intervention by Thomas Vladut, email: retom@cadvision.com
<mailto:retom@cadvision.com> <mailto:retom@cadvision.com
<mailto:retom@cadvision.com> >
URL: www.cadvision.com/retom <http://www.cadvision.com/retom>
<http://www.cadvision.com/retom <http://www.cadvision.com/retom> >

Tel: 403-238-1567 fax
250-6711

for meeting of April 9, Calgary.

Attention: Moderator, Mr. McMillan [? Not sure]

Water a special commodity, Water as resources.-

Strategy Alberta : Alta Environment Enhancement Act

1. World Commission on Dams strategy recommended as a reference on water associated strategies. Available to be downloaded from:

http://www.dams.org/report/
<http://www.dams.org/report/>

[a hard copy available; and could be lended if desired]

Core Values (5): Equity, Efficiency, PDM: Participatory Decision Making, with Sustainability and Accountability [EEPSA].

B. Implementation Strategies (7): Public Acceptance/1/, Assessment of Options-Comprehensive/2/, Addressing Existing Dams, Assets /3/, SRL, Sustaining Rivers and Livelihoods/4/, Sharing Benefits-RC: recognizing entitlements /5/,

Complience/6/, Shared Rivers /7/.

C. Guidelines of Good Practice (26): Stakeholders, Negotiated DM, Consent, EIA,

LCA (Life Cycle Assessment), GGE (Greenhouse Gas Emission, Social & Economic Assessment, and Baseline Social & Eco Conditions, Mitigation (resettlements)
BSM: Benefit Sharing Mechanism, Compliance, etc.

2. Learning from Nature:

a. Regional reservoirs and out of rivers accumulations. ie for demands not satisfied by Meridian Alternatives.

b. The "passive" reservoirs: LAKES

1.Organic Carbon (OC) burial,

Annual bury four time more than in oceans

tructuring Alberta sinks, balancing KYOTO obligations.

2a. a potential seminar associated to the world water forum

2003 may be structured in the future.

COUNTY OF GRANDE PRAIRIE #1

BRIEF ON

WATER FOR LIFE

ALBERTA'S STRATEGY FOR SUSTAINABILITY

APRIL 2, 2002

INTRODUCTION

Water is one of our most precious commodities. The government is now recognizing the issue that municipalities and others have recognized for years; there needs to be a comprehensive approach to the use of water in Alberta. This comprehensive approach must examine the use and abuse of water in Alberta.

The County of Grande Prairie is located in the Peace/Slave River Basin, the largest river basin in Alberta. The river basin is probably one on the last great-untapped resources in the province. The wise use of water from this basin begins with ensuring that the water from the basin remains in the basin.

There are many facets to the water issue, future trends, conservation and management of the resource, groundwater, surface water, water quality, the rights of municipalities and individuals, and the levels of responsibility. The purpose of this brief is to outline the County position on the subject of water.

The Province has produced a booklet entitled "Water for Life". The book contains many facts and figures pertaining to water use in Alberta. It is certainly enlightening to see how water is used in this province. This brief will endeavor to address the many issues in the book.

The County recognizes that Alberta is a growth province. Our area of the province shares in this growth. With the wise management of resources, the growth we have experienced in the past will continue. Growth can produce strains on infrastructure and resources. Sustainable growth implies that a balance is found between encouraging growth and minimizing the impact on the environment and our most precious resources, land air and of course, water. Continued growth will place additional strains on resources, particularly water as the various interests compete to secure an adequate supply.

Management of growth requires that municipalities play a major role as growth The County of Grande Prairie #1 has been consistently in favour of a strategy that advocates the wise use of water. However it seems that it has taken a drought in southern Alberta to finally have the province initiate action on this important issue. It is our expectation that any future strategy will be a balanced strategy, one that tries to find a balance between economic development and sustainability. It should be a strategy that examines the existing use of water in the province and makes recommendations for change based on the sustainability of various practices. It should not be a justification for the need for interbasin transfers of water to support unsustainable growth patterns. It should not be a justification for a huge infrastructure program to support growth in southern Alberta at the expense of northern Alberta.

GROUNDWATER

The issue of groundwater is one that the County considers extremely important. As a large rural municipality, groundwater is a vital necessity to our farmers, our industries, our urban neighbours and our way of life. The County of Grande Prairie has been on record for many years advocating the need for the wise use of groundwater and for additional study on groundwater and groundwater recharge systems. The County is in favour of the responsible use of groundwater.

In the past the government of Alberta has not shared this vision. Many studies have been completed analyzing the location, volume, depth, quality and transmissibility of groundwater in the County. Unfortunately however the government has allowed the use of precious groundwater for industrial purposes without fully understanding the implications to resource. Decisions have been made to use the resource without regard to the capacity of the resource to sustain it. Consequently, in many areas of the County, the use outstrips the recharge capacity resulting in the lost of water supply to non- industrial users.

Furthermore, the lack of control on drilling processes has resulted in the contamination of the groundwater resource. Water quality has suffered enormously as drilling chemicals, mud and oils and gases from other levels have been allowed to escape into groundwater aquifers.

The result has been a significant loss in the capacities of many wells in the County of Grande Prairie due to oil and gas activity and the use of groundwater for oil and gas enhancement and recovery procedures. It has resulted in the loss in the quality of groundwater to the point where many County residents can no longer rely on groundwater as a potable water supply and must bring in water from other sources.

The use of freshwater groundwater as a source of water for oil injection processes is one of the most unfortunate decisions, which has ever been made. Freshwater on the planet is a limited resource. The "Water for Life" describes Alberta's water as a "finite" resource. The use of the freshwater in enhanced recovery processes means that this source of water is lost forever and cannot be replaced. All of this is done to ensure efficiency and profitability of large multi-national oil companies and to the detriment of the local landowners and non-industrial users. Other water bearing formations are available but are not used due to cost. In the end, the oil companies profit while other users are the net losers.

Additional study needs to document the types of formations in the Peace region, the potential yields, the recharge areas and impact of resource development in the recharge areas.

WETLANDS and LAKES

Wetlands are an important part of the eco-system and are directly connected to the groundwater system. With the loss in our groundwater, the wetlands have also shown a noticeable decline. Not all of the decline can be attributed to the drop in groundwater levels but it is a contributing factor.

With respect to the priorities of our wetlands and lakes, agriculture must take priority over recreation activities. The requirement to grow food is paramount.

The County has supported efforts to buffer wetlands and lakes from encroachment by taking land immediately adjacent to the water body as environmental reserve and leaving the land in its natural state. More recently the County has been utilizing environmental reserve caveats along creeks and streams to protect the riverbanks from encroachment. The caveats seem to work well for both the landowner and the County in that the land is protected but at a reasonable cost to both parties.

At the same time, the strategy must reflect a common sense approach to drainage projects. Drainage projects need to be designed to keep water flowing in their watercourses. This means that watercourses that become obstructed need to be cleaned and cleared of their obstruction notwithstanding the impact on a temporary habitat. Other larger and more costly drainage projects need to be reexamined in terms of the cost effectiveness of providing the project.

SURFACE WATER

The other important water resource for the County is our river systems. The rivers are an integral part of the watershed. Rivers serve a variety of purposes, as a water source for urban municipalities, important recreation areas, and wildlife habitats and as a discharge area for our wastes. The use of our rivers as a long-term sustainable resource for our water supply is inevitable. In our region, the Wapiti River is currently used to supply water for the City of Grande Prairie. It is likely that the long-term supply will be the Smoky River due to its larger size and volume of water flowing through the system.

The area must be allowed to utilize the water from these two rivers. At the same time, the two rivers also receive our waste streams. We must work towards developing higher discharge standards to ensure that the waste we put back into the river is equal in quality to the water we remove.

The County notes that the river basins with the largest volumes of water lie in northern Alberta. At the same time much of the infrastructure developed to manage river systems lies in southern Alberta. This includes waterpower development. Any future strategy should provide a level playing field respecting the development of waterpower sources so that the north can take advantage of its natural resources.

CLIMATE CHANGE

The County observes that there has been a noticeable increase in the dryness during the past 4 years. It is difficult to say if this is a long-term trend or a cycle. Nevertheless, the County suggests that a comprehensive strategy for dealing with the cycles, short term or long term that encourages the wise use of water is appropriate. Appropriateness is defined as utilizing only the water available within the river basin. The interbasin transfer of water must not be allowed and is not supported.

CONSERVATION and WATER MANAGEMENT

Conservation is one of the most important concepts in ensuring "Water for Life". The book produced by the Province clearly indicates that irrigation is responsible for nearly 71% of the surface water use in Alberta. As irrigation is most prevalent in the drier areas of the Province, where it appears that the "water shortages" are the most acute, one must question if irrigation is the wisest use of surface water.

The priority for the use of water should be for human consumption and livestock. All other uses should be secondary in nature. Where other non-potable water sources are available for use, these should be used notwithstanding the additional expense. Potable water should not be used for industrial purposes where other sources are available.

The Province must develop programs and policies that promote the efficient use of water across the board. This includes human consumption, commercial and industrial usage and particularly irrigation. Water should not be wasted.

Water management to the County implies " who gets to manage the water resource." In the County's opinion, the ultimate management of the resource needs to lie with the province and government. This is a responsibility that should not be delegated to the private sector. A government that is accountable to the people must be in charge of the resource. It is not something that the province can lose control over.

In the past, the province has provided advice and analysis to municipalities regarding the impact of development on water supply and water resources. Subdivision applications and development permits were routinely circulated to the Department of Environment for expert analysis respecting the water quantity and quality. Recommendations were given to the municipalities to implement as part of the approval process.

Through government restructuring and downsizing, this service is no longer available. Municipalities are left with having to interpret water testing and reports provided by professional engineers on their own. All guidelines and standards adopted by the province are merely guidelines with no legislative force. The government must restore these services and make them available to municipalities in decision-making. It is in the public interest to do so.

The development of regional water delivery and treatment systems is necessary to ensure the safety and security of a supply of water. Municipalities should not be allowed to hold other municipality's hostage over the access to safe and secure supply. Duplication of services must be avoided. More incentives are needed to develop regional systems particularly in northern Alberta.

RIGHTS

With respect to water rights, the County interprets this to mean that the 1st user has the right to a secure and sustained supply of water, that other subsequent users should not impact the first user. Where such impacts occur, the 1st users should be compensated.

With respect to multi-parcel subdivisions that rely on groundwater as the source of water for the residents, more emphasis needs to be placed on the cumulative impact of several multi-parcel subdivisions in an area relying on a single aquifer to provide the water. Similarly agricultural users should have priority over other industrial users.

WATER QUALITY

Water quality should be a priority within any future provincial strategy. Water quality standards starts with requirements for the treatment of wastewater. Higher standards need to be adopted to ensure that any discharge does not harm users downstream.

Every effort needs to be made to reduce the pollution of our water sources. Given the provincial role in the regulation of intensive livestock operations, the County seeks assurances that intensive livestock operations will not pollute any water supply.

Deterioration of water quality can in many cases be attributable to drilling activities. In this case, the government needs to coordinate drilling standards and approvals. Currently one standard exists for water well drilling in one department and another for oil companies and their own approval system. If the government wants to ensure water quality standards are enforced, one system should apply to all.

CONCLUSIONS

The County of Grande Prairie supports the development of a comprehensive water strategy for the province. The strategy should not be a blueprint for the interbasin transfer of water from those parts of the province with an abundance of water to those areas of the province that have less water.

The strategy should enable those parts of the province with an abundance of water to achieve their economic potential. It should create a level playing field across the province, to allow northern Alberta to develop the water resources in northern Alberta in the same manner that southern Alberta has developed and managed their resources.

The Province needs to be actively involved in water management, to develop the resources to fully evaluate the impact of development on water. It must make these resources available to municipalities.

The Province must give priority for use to existing users. New users must not impact on the quality or quantity of the water supply of existing users.

Potable water must not be used for oilfield injection purposes unless not other source is available. Strict controls must be placed on this.

The Province must encourage the development of regional water systems in order to ensure the delivery of a safe and secure supply of water.

The Province must promote conservation and the wise use of water. Programs that do not support this objective should be ended.

Every effort should be made to protect water quality. Higher discharge standards for the treatment of wastewater is a must.

Finally the government must maintain control of the water. It cannot be sold to private industry otherwise all the objectives will be lost.

19. Clearwater County

Clearwater County

April 01, 2002

Honorable Dr. Lorne Taylor
Minister of Environment
423 Legislature Building
Edmonton, AB
T5K 2B6

Dear Minister Taylor

The Clearwater County Council has been participating in the in the Alberta Water for Life Strategy by completing the questionnaire and by attending the Rocky Mountain House Open House Forum March 21, 2002. We thank you for providing this excellent opportunity for us to become more familiar with the issues and for you and your department to hear more on our concerns.

This letter is intended to point out some serious concerns of the Clearwater County Council, the Agricultural Service Board and the ratepayers we represent and we request that they be included in the feedback gathered from the Strategy process:

1. The Farmers Advocate and EUB should be asked to put together an information package with respect to guidelines governing the drilling of seismic shot holes and water wells used in conjunction with oil and gas well drilling. This package would be given to a landowner at the time of land access negotiations between company representatives and a landowner. An informed landowner is in a knowledgeable position to negotiate his rights with a company agent regarding activities that involve water and his land. It will also disclose the obligations the company has to monitor compliance with government guidelines during and after the industrial activity has ceased.
2. The Province must initiate immediately, a review of the use of all water for deep well injection to boost oil or gas production. This review would identify alternative ways to boost production without using any water. Surely given the scarcity and the value of all water, its continued use in this manner cannot be supported considering the numerous alternative methods not requiring water.
3. The Province must not allow for the sale of water licenses or portions thereof between non-government parties. We agree that money can promote water conservation. However, we feel that the purchase or sale of water rights, if it is to occur at all, should be a function of government control. This is a significant provincial resource. It is not in the best interest of Albertans to allow the wealthiest to control this resource or to make decisions on our behalf.

Thank you very much for giving us the opportunity to comment on this most important issue.

Sincerely

Milton Elliot

Milton Elliot, Reeve

Cc Agricultural Service Board Chairman
Ty Lund: Minister of Infrastructure
Council

RECEIVED
Client Relations Unit
Alberta Environment
APR 8 - 2002
AR #3648
File #

P.O. Box 550 . Rocky Mountain House . AB . T4T 1A4
Telephone (403) 845-4444 Fax (403) 845-7330
Homepage: www.town.clearwater.ab.ca E-mail: admin@county.clearwater.ab.ca

Red Deer Chamber of Commerce

Water Management – Central Alberta

Present demands for water in Alberta are already significant, but population and community growth, industrial expansion and the continued expansion and intensification of agriculture will place greater pressures on the supply of water in Alberta, and particularly Central and Southern Alberta. There is also a need to maintain base flows in rivers to sustain the life in rivers and the amenities they offer. If decreased source flows occur as a result of global warming, this places another pressure on Alberta's renewable yet limited water resources.

In Central and Southern Alberta, and particularly those parts lying within the South Saskatchewan River Basin, the distribution and availability of water is a major concern. Present commitments and growing demands for water, especially during a dry year such as 2001, is insufficient to meet future demands. Therefore, the Red Deer Chamber of Commerce has significant interest in any review of Water Management within the province.

This interest is heightened since the Red Deer River Basin, from a water supply perspective, is disadvantaged, in comparison to the more southerly Bow and Oldman River Basins, due both to natural flow conditions and past water management commitments to the irrigation industry in these two basins.

Of the three sub-basins, the Red Deer River basin is by far the largest geographically and is the second most populated. It also has the smallest flow. The average flow of the Red Deer River is only 57% that of the Oldman River and 48% of the Bow River.

While it is already disadvantaged (with respect to the amount of water naturally available), over the years a series of major water management policy decisions have further restricted the supply of water available for use (consumptive) in the Red Deer River Basin. Through the Prairie Provinces Master Agreement on Apportionment, Alberta is committed to allow 50% of the flow of the South Saskatchewan River system into Saskatchewan. Thus, Alberta is permitted to net deplete only 50% of the water arising and flowing through Alberta's portion of the South Saskatchewan River system. However, there is no provincial policy which assigns the amount of water from each of the Oldman, Bow, and Red Deer Rivers that can be consumed (net depleted) by each sub-basin.

In the early 1980's the Provincial Government created the Alberta Water Resources Commission to study and report on water management in the South Saskatchewan River Basin. One of the fundamental questions raised by the Provinces was "How much water will each of the Red Deer, Bow, and Oldman Rivers contribute to the amount of water that Alberta must supply Saskatchewan each year?" In its report on Water Management in the South Saskatchewan River Basin (1986), the Alberta Water Resources Commission recommended "The government continue to manage water on a river basin basis, considering the South Saskatchewan River system to be a single basin for the purpose of apportionment." In announcing the South Saskatchewan River Basin Water Management

Policy (1990), the province followed the recommendation. It did not apportion water from each sub-basin in order to provide the greatest flexibility in managing waters across the entire river basin.

While on the surface this seems fair to the Red Deer River basin, in reality water management in Central and Southern Alberta is now far from equitable. Because of the amount of water in the Bow and Oldman River basins committed to the irrigation industry, which is by far the most consumptive user of water in Southern Alberta, those basins no longer can provide 50% of their flows to Saskatchewan in many, if not most, years. This means, in order for Alberta to meet its commitment to supply 50% of the flow of the South Saskatchewan River to Saskatchewan, that the Red Deer River – in addition to 50% of its flow – must also supply the volume of water represented by the shortfall in flows from the Bow and Oldman.

Essentially then, the Red Deer River basin has become a donor of water to the Bow and Oldman River basins. As such, the Red Deer basin (its communities, businesses, industries, farm users, etc.) no longer has the ability to use (net deplete) 50% of the water in its basin, unlike the Bow and Oldman which can net deplete more than 50% of their flows.

Because of the much larger flow volumes of the Bow and Oldman Rivers, for each 1% of their flow not supplied to Saskatchewan, a much larger percentage of the Red Deer's flow must be committed. Using a scenario where the Bow and Oldman basins consume 56%, the Red Deer River must supply 75% of its flow to Saskatchewan. As a result, the amount of water available from the Red Deer River to present and potential future water users is reduced by a further 50% (i.e. from a 50% share to a 25% share). Obviously, this negatively impacts, and greatly so, the ability of communities, industries, farms, etc. in the Red Deer River basin to pursue and meet their future economic potential.

There are numerous issues related to the management of water in Central and Southern Alberta and an acknowledgement that restricted access will curtail the long term economic potential of our region and our province.

Recommendations:

The Alberta Chambers of Commerce recommends that the Government of Alberta:

- Encourage the Government of Canada to introduce a national Water Management Strategy developed in concert with the provinces, territories, and water use stakeholders.
- Take an active role in communicating and promoting conservation measures and awareness to increase the understanding of the various Water Management responsibilities of municipalities, irrigation districts, and conservation authorities throughout the province.
- Replace the current river basin apportionment with a provincial policy which assigns the amount of water that can be consumed by each sub-basin.

- Support research and data collection for proper forecasting of stream flows and possible long-term flow changes which may impact activities in the areas of water management.
- Ensure water quality is a key strategy to be addressed in a water management Strategy.
- Maintain a minimum of current levels of water quantity and availability within each river sub-basin and ensure this priority is a key strategy within a water management strategy.

21. Health Canada

Health Canada **Santé Canada**

Healthy Environments and Consumer Safety Branch

Direction gé né rale de la santé environnementale et da la sé curité des consommateurs

Alberta/Northwest Territories Region
Suite #839, 9700 Jasper Avenue, Edmonton, Alberta T5J 4C3
Tel/Tel (780) 495 - 2626
Fax/Telecopieur (780) 495 - 2624

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To / A: Equus Consulting Group Inc.

Fax / Telecopieur: 423-4745

Visit the Health Canada Web site:
Visitez le site Web de Santé Canada:

www.hc-sc.gc.ca

From / De: Stacey Smythe
Safe Environments Specialist

Tel / Tel: (780) 495-5659

Pages: 2 (including cover page)

RE: Submission for public consultation on *Water for Life: Alberta's Strategy for Sustainability*

Message:

Please see attached letter.

Health Canada
Santé Canada

Healthy Environments and Consumer Safety Branch
Direction générale, Santé environnementale et sécurité des consommateurs

April 15, 2002

Your file Votre référence

Our File Notre référence

RE: Water for Life: Alberta's Strategy for Sustainability

To whom it may concern:

Please accept the following response from Health Canada to the Government of Alberta's comprehensive water strategy and consultation entitled *Water for Life: Alberta's Strategy for Sustainability*. Several areas of the proposed strategy are of interest to Health Canada:

1. Priorities for the water strategy

Health Canada encourages Alberta to place the highest priority on providing a "safe and secure drinking water supply" to Albertans. We recognize that healthy sustainable ecosystems; reliable, quality water supplies; and the knowledge to make effective water management decisions are fundamental objectives for water management. Health Canada sees these elements as essential in the management of drinking water from source-to-tap-to-source across Canada. We acknowledge the importance of Alberta's water strategy and recognize that drinking water safety (and human health) must take precedence over economic uses.

2. Options for municipal water systems

Health Canada proposes an additional option for the section on small municipal water systems: ongoing training and certification for operators. Given the important and essential role operators have in ensuring the safety of treated drinking water, Health Canada encourages Alberta to include explicit commitment to operator training and certification in their water strategy.

3. Allocating water supplies

Health Canada recommends that Alberta carefully consider the proposal to allocate water based on its most beneficial or valued uses. Drinking water is one of, if not the most, beneficial and valued use of water. Placing such a high priority on drinking water will best serve the majority of Albertans. At Health Canada, we are supportive of allocating water based on the value of its use. Policies that replace the current "first in time/first in right" rule, should assist the Government of Alberta to manage the resource should conflicts over water allocations arise.

Thank you for the opportunity to comment. Please contact Stacey Smythe (780-495-5659) should you wish to discuss these comments further.

Sincerely,

S. Smythe

Stacey Smythe, Safe Environments Specialist

Canada

22. Ducks Unlimited

Ducks Unlimited Canada

To: Robert Harrison April19, 2002
From Les Wetter

Re : *Water for Life: Alberta's Strategy for Sustainability*

The following is Ducks Unlimited Canada's (DUC) official positions on the ongoing Alberta Water Strategy.

We have used the questionnaire in a digital format to present our position. Our comments are in **bold**.

In summary our position is:

- The health and integrity of ecosystems should come first in any water planning or water strategy. All sustainable human benefits depend on healthy ecosystems.
- Healthy functioning wetlands and watersheds are essential to maintaining the ecological value of many ecosystems.
- In the past we have lost many wetlands, especially in the settled area of the province. This loss should not be allowed to continue. Wetland and watershed functioning must be maintained, or in cases where this is not possible, the loss must be mitigated.
- Watershed planning which includes governments, industry, stakeholders and the general public is essential to a wise water strategy.

Ducks Unlimited Canada
#1, 5550-45st
Red Deer AB
T4N 1L1
(DU)
403-342-1314
l_wetter@ducks.ca

part a
what are the challenges?

Since the water strategy will address the future of Alberta's water management, some assumptions must be made about the challenges we will face in the future. Late last year, a small, diverse "ideas" group of Albertans provided the Government of Alberta their advice on water management in the province. Their input, combined with some additional research, has led to the list of challenges in the table below.

1. Review the following list of challenges. For each challenge, indicate whether you agree or disagree with the statement.

Possible Future Challenges Agree Disagree Unsure

a. Water will become an increasingly scarce resource in Alberta
Agree

b. Access to safe drinking water will become a significant issue for Albertans
Agree

c. Water availability will limit growth in Alberta
Unsure

d. Climate change will seriously affect water flows in Alberta
Unsure but climate will always be variable.

e. Industrial and agricultural growth will create greater demands for water – not always in places where water is plentiful
Agree

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth
Agree, but ecosystem should come first.

g. Surface water and groundwater will be vulnerable to pollution and contamination
Agree, but wetlands and good watershed planning can mitigate this.

h. Flooding will pose a threat to human safety and create potential damage and economic costs
Agree, but wetlands and good watershed planning can mitigate this.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important
Agree

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Unsure, but natural storage areas, such as wetlands, shouldn't be drained.

2. Of these challenges, please indicate the three most important for the Government of Alberta to address

f Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth
i Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important
a Water will become an increasingly scarce resource in Alberta

3. Are there any additional challenges that should be considered?

Answer: A sustainable environment is necessary for a sustainable economy. Albertans will have to plan more carefully so both the environment and the economy can be maintained.

what objectives should guide a future water strategy?

The "ideas" group identified four fundamental objectives for the water strategy. They are to ensure Alberta has:

- Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater)
- A safe, secure drinking water supply
- Reliable, quality water supplies for a sustainable economy
- The knowledge necessary to make effective water management decisions

Alberta's water strategy will assist the Government of Alberta to make wise water management
decisions, now and in the future.

4. Do you agree these objectives should guide Alberta's water strategy?
Answer:Yes, The first three objectives should be in order of priority, if our environment is not maintained we will have no economy in the future. The fourth objective should be applied overall.
If no, what would you change or add?

Part b
Achieving safe secure drinking water

Private Water Systems

Private water systems are typically found in rural areas. Because of the distance between house-holds, it is generally too expensive for these property owners to connect to a municipal drinking water system. Therefore, approximately 600,000 Albertans get their drinking water from a source other than an approved water treatment facility. They get their water by drilling into the ground, using a lake or river, or by hauling water in by truck and storing it in large holding tanks. Sometimes a group of rural residents will establish a water co-operative that provides untreated water to its members.

5. Do you get your water from your own private system? Yes No
no comment

6. Because private systems fall outside Alberta Environment's approval process, the safety of private water supplies can not be guaranteed. Currently, the property owner is responsible for ensuring his or her own water quality and quantity.

Considering this, please review the options in the table below. For each option, indicate:
1=Property owner's responsibility,
2=Shared responsibility between the property owner and the provincial government,
3=Provincial government's responsibility.

Please add any additional options in the space provided.

Monitor the quality and safety of the water supply for private water systems
1 2 3
No comment

Develop pipelines and regional water supply systems (water coops) to deliver an untreated water supply to individual rural residences
1 2 3
No comment

Develop individual water supplies.(e.g. well drilling, dugout construction, water hauling)
1 2 3
No comment

Pump water from distant sources to dugouts during times of drought.
1 2 3
No comment

Add your own example...

Ensure rural groundwater and local surface water supplies are maintained by wise land use planning which protect recharge watersheds, wetlands, lakes and rivers from destruction.

Answer 2=Shared responsibility between the property owner and the provincial government, Municipal governments should also share this responsibility.

Small Municipal Systems
Towns, villages, hamlets and municipal developments often find it difficult to pay for the construction and operation of water facilities. They also find it difficult to train and keep staff to operate these facilities.

7. Do you get your water from a small municipal system? Yes No
No comment

8. Alberta Environment currently sets and enforces drinking water standards for every Alberta municipality, reviews the water quality reports prepared by each municipality, and certifies the facility operators. Small municipal systems, however, are still more vulnerable to possible contamination as they are less able to invest in new technologies and overall improvements to their water treatment facilities. Considering this, please review the options in the table below. For each option, indicate whether it should be implemented, and if so, by whom:
1=Municipality's responsibility,
2=Shared responsibility between the municipality and the provincial government,
3=Provincial government's responsibility.
Please add any additional options in the space provided.

Supply technical advice to small municipalities about facility operations, maintenance and monitoring 1 2 3
No comment

Monitor the quality and safety of water at small water treatment plants 1 2 3
No comment

Develop regional water supply systems 1 2 3
No comment

Add your own example...

Ensure intake water supplies are good quality by wise land use planning that protect watersheds, wetlands, lakes and rivers from destruction and pollution. Protect water above the intake pipe, water treatment will be more cost effective.

Answer 2=Shared responsibility between the municipality and the provincial government,

9. Do you think companies (public or private) should be allowed to invest in water systems and provide drinking water to small municipalities? Yes No
No comment

reliable, quality water supplies for a sustainable economy

The availability of water is a real constraint to the type, amount and location of economic growth in the province. Without sufficient water, Alberta may see significant constraints in the expansion of agriculture in the south, oil sands in the north, and petrochemical development in central Alberta. The water strategy must address the issue of water availability for continued economic growth in Alberta. This section focuses on Alberta's economy, and striking the right balance between a sustainable economy, a healthy environment and the social well-being of Albertans.

How water is allocated in Alberta
Agricultural, industrial and municipal water users apply to Alberta Environment for a license to use a set allocation of water. Wherever possible, water is managed to provide for these users. In times of shortage, however, the most recently issued license holders are asked to shut down so that more senior license holders can be assured their allocation under the current priority system. This system is known as *first in time, first in right*. The older the license the higher its priority, regardless of how the water is being used. Before water can be allocated to new users, Alberta Environment must consider three things:
a) *Aquatic environment*
The amount of water necessary to safeguard and maintain aquatic ecosystems must be determined and preserved.
b) *Apportionment agreements*
Alberta has made commitments to the province of Saskatchewan and the state of Montana over the amount of water that will flow into each respective jurisdiction.
c) *Existing water licenses*
New water allocations must not impact existing licenses.

The first step in deciding how much water can be allocated is to determine the amount necessary for the aquatic environment, for apportionment agreements, and for existing water license holders. This amount is subtracted from the total amount available, the remainder can then be used for supporting the economy and for human use. Depending on weather conditions, that amount is different each year.

Under current practices, once the total amount of water available for human use and economic development has been allocated, a moratorium is placed on the river basin or groundwater aquifer and no further water is allocated. Certain basins in southern Alberta are nearing the limits of water. Allocation particularly during dry periods when less water is flowing in the rivers.

In the South Saskatchewan River Basin, there is little opportunity remaining for any major operation to obtain a license to withdraw water from the basin. There is a possibility this trend will continue.
Depending on unpredictable variables such as future weather patterns, we may begin to see other river basins reaching their limits of available water in the next 25 years.

10. Please review the following list of options. Indicate the extent to which you agree or disagree with each option by circling the appropriate number:
1=Strongly Disagree,
2=Disagree,
3=Not sure,
4=Agree,
5=Strongly Agree.
Please add any additional opinions in the space provided.

Options *(How could we respond if river basins become fully allocated?)*

Determine groundwater availability throughout the province 1 2 3 4 5
Answer = 5, we should identify recharge areas (watersheds, wetlands) at the same time.

Allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin 1 2 3 4 5
No comment

Allocate water based on its most beneficial, or valued, uses 1 2 3 4 5
No comment

Allocate water to further uses even if this potentially harms aquatic environments 1 2 3 4 5
Answer =1, If we destroy the environment we destroy the economy for future generations.

Set aside water for future population growth before there are any shortages 1 2 3 4 5

No comment

Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water) 1 2 3 4 5

No comment

Encourage more efficient use of water through pricing to reduce overall use

1 2 3 4 5

No comment

Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

1 2 3 4 5

No comment

Investigate construction of closed diversions from another river basin costs. (water goes directly from one basin to an operator in another basin, but does not enter the river system)

1 2 3 4 5

Answer = 1 The environmental risks are to high. DUC has taken a public policy stance against inter-basin transfer for reasons of ecological integrity.

Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

1 2 3 4 5

Answer = 1 The environmental risks are to high. DUC has taken a public policy stance against inter-basin transfer for reasons of ecological integrity.

Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

1 2 3 4 5

No comment

Add your own example...

Maintain natural storage on the land base (e.g. wetlands) These are in place and cost no money to build or maintain and release water slowly.

If water is to be allocated based on its most beneficial, or valued, uses it must be recognized that water to maintain the environment is the most valuable use.

water conservation

Water conservation refers to the planned protection, improvement, and wise use of water resources. It also includes controlling, protecting, and managing water. Water conservation may also mean improving the efficiency of industrial and agricultural water use. By generating the most efficient use of water, its overall productivity is enhanced and more water is made available for new operations. Increased water efficiency and water conservation plans also reduce the need for high cost expansions of water treatment and distribution systems.

11. Please review the following list of options for conserving Alberta's water. Indicate the extent to which you agree or disagree with each option by circling the appropriate number:
1=Strongly Disagree,
2=Disagree,
3=Not sure,
4=Agree,
5=Strongly Agree.
Please add any additional options in the space provided.
Options for Conserving Water

Establish a price for water used by industrial and agricultural operations
1 2 3 4 5

No comment

Establish a price for water used by individual
1 2 3 4 5

No comment

Educate Albertans about water conservation values and methods
1 2 3 4 5

Answer 5=Strongly Agree,

Establish water conservation incentives (e.g. tax rebates) offered by government
1 2 3 4 5

No comment

Set targets for water conservation for various sectors using best management practices
1 2 3 4 5

No comment

Add your own example

Ensure all ecological use of water (e.g. to maintain the natural environment) is free, without a monetary cost, and first in priority. Human health and economic wealth depends on a sustainable environment.

safeguarding alberta's healthy ecosystems

Healthy aquatic ecosystems are integral to Alberta's water resources. As the province's economy and population grows, aquatic ecosystems are affected as we allocate water from natural sources to human uses. Aquatic ecosystems are also affected by changes in water quality that result from human use. The Government of Alberta adopts international quality standards and monitors some portions of aquatic systems to ensure they are not being damaged by human use.

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option by circling the appropriate number:
1=Strongly Disagree,
2=Disagree,
3=Not sure,
4=Agree,
5=Strongly Agree.
Please add any additional options in the space provided.

Options for Protecting Aquatic Ecosystems

Determine how much water the aquatic environment requires to remain healthy
1 2 3 4 5

Answer 5=Strongly Agree. In the absence of good data, allow for more water for the aquatic environment.

Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin
1 2 3 4 5

Answer 5=Strongly Agree. This should be done in a water management plan involving all stakeholders.

Determine the maximum amount of substances (e.g. phosphates) a or lake can accept without causing it harm
1 2 3 4 5

Answer 5=Strongly Agree.

Identify sensitive aquatic environments or habitats that require additional protection
1 2 3 4 5

Answer 5=Strongly Agree.

Develop water management plans that integrate protection of aquatic ecosystems with watershed and land decisions on land use, management
1 2 3 4 5

Answer 5=Strongly Agree. Water does not begin its journey at the bank of a lake, stream, river or wetland, watersheds are an integral part of any water strategy.

Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use

1 2 3 4 5

Answer 5=Strongly Agree. Without a healthy environment human use will be limited for future generations.

Additional comments
Please feel free to submit any additional thoughts or ideas you may have.

In the Introduction to *"Water for Life: Alberta's Strategy for Sustainability* **" the following statement is made:**

> "In the past we have seen relatively few water management conflicts: there has been enough water to meet the demands for industrial, agricultural and population growth; economic and land use activities did not create major impacts on the amount of water or its quality: technological improvements and regulatory systems have been able to limit the impact of agricultural, industrial and municipal discharges."

In regard to this DUC would comment that the drainage of wetlands and the loss of environmental, social, economic and aesthetic values has been substantial. This loss in quantity and function should not continue. We believe this loss should be mitigated through the restoration of drained wetlands. Mitigation funding should be provided for this purpose.

In some parts of the supporting documents wetlands and watersheds are included along with rivers, lakes and groundwater, in other parts watersheds and wetlands are not included. Water sheds and wetlands are critical to healthy environmental functioning and should always be included as an environmental concern.

The first three objectives in the water strategy should be in order of priority, if our environment is not maintained we will have a much poorer economy in the future. The fourth objective should be applied overall.

Water does not begin its journey at the bank of a lake, stream, river or wetland, watersheds are an integral part of any water strategy. Non-point pollution sources can only be protected against through watershed planning and protection. Wetlands function as a critical component of watersheds. Wetlands act as nature's kidneys. They help to purify surface water by breaking down, removing, using or trapping nutrients, agricultural herbicides and pesticides, organic waste and sediment that is carried to them by runoff water

Wetlands and healthy watersheds contribute to groundwater recharge. They recharge groundwater supplies by soaking up surface water and letting some of it seep back into the ground where it's filtered even further Wetland loss will mean decreased amounts of groundwater Research has shown that shallow ephemerally flooded areas contribute significantly to groundwater recharge. Planning exercises should identify recharge areas (watersheds, wetlands) at the same time as we identify ground water.

Nature provides us ways to mitigate floods. Wetlands reduce the severity of floods by retaining water and releasing it slowly during drier periods. They protect shorelines from erosion by slowing the flow of water and lowering the crest of rivers and streams during spring and storm runoff peaks.

23. City of Edmonton

April 23, 2002

Honourable Lorne Taylor
Minister of the Environment
423 Legislature Building
10800 – 97 Avenue
Edmonton, Alberta T5K 2B6

Dear Minister Taylor:

Thank you for the opportunity to provide input into the development of the Alberta Water Strategy "Water for Life – Alberta's Strategy for Sustainability". I congratulate your initiative in developing this strategy that will be important to all Albertans. As a follow up to my letter of March 28, 2002, I would like to reiterate that the City of Edmonton will be vitally affected by Alberta's Water Strategy. As one of the two largest cities in our province, Edmonton contributes to the Alberta Advantage in a number of ways not the least of which is ensuring clean water is supplied to our region, and sewage treatment is first class.

The City of Edmonton's response is included in the attached completed questionnaire. Additional comments have been incorporated where clarification is required to ensure that our responses are interpreted in the intended context. There are also a few key underlying aspects that need to be highlighted as this process moves forward:

- Ecological protection of our water resources needs to be the foundation of the water strategy as this is a key factor for our quality of life and healthy economy.
- Water quality and quantity and land use are interrelated and need to be considered in this relationship context.
- Due to a concerted effort over the past decades, the North Saskatchewan River water quality has improved within the City, but water quality is now threatened due to increased activity in the watershed.
- Basin watershed planning is required and is most effective before the onset of major problems, as there are more management options available at this stage.
- An effective process for the implementation, maintenance and monitoring of watershed plans, including addressing non-compliance issues is required.
- The City supports the current policy of not allowing interbasin transfer of water.
- Education on source control for all sectors is a cost-efficient and practical method of improving water quality.
- In addition, an aggressive approach to water conservation can help to address water quantity issues.
- Research on emerging water quality and quantity issues is essential.

I would also like to take this opportunity to formally request that the City of Edmonton have representation at the Minister's Forum on Water to be held in late spring 2002.

Yours truly,

Bill Smith
Mayor

An Introduction to Alberta's Water Strategy

More than ever before, Alberta's water resources are facing significant challenges. Population growth, climate change, agricultural and industrial development have all contributed to water quantity and quality issues. Recent events in Walkerton, Ontario and North Battleford, Saskatchewan have turned the country's attention to the safety of drinking water across the country.

Alberta has adapted its water management policies over time to keep pace with new issues, but we need to do more. That is why Alberta is now developing a comprehensive water strategy. Water for Life: Alberta's Strategy for Sustainability will include short-, medium- and long-term means to ensure healthy ecosystems; safe, secure drinking water; and reliable, quality water supplies for a sustainable economy. It will build on the notion that knowledge is the foundation for making good water management decisions.

The Government of Alberta is seeking your input into the development of its water strategy. There is more than one opportunity for you to participate. Completing and submitting this work book represents one opportunity, attending a community workshop is another, and should you be randomly selected you may choose to participate in a telephone survey on this topic. For details on how you can participate, call 310-4455 or visit www.waterforlife.gov.ab.ca.

The input you provide the Government of Alberta will go a long way. Since the water strategy is a plan for the next 25 to 50 years, it is very possible that the ideas you submit today will come in handy in 2010, 2020 or maybe even 2052.

This work book, Water for Life: Seeking Fresh Ideas, is part of an information package available to all Albertans. The package also includes an information book and a brochure. The information book provides an overview of Alberta's current water resources, and outlines current water management policies and practices. The brochure details the water strategy's development and consultation processes, provides a complete listing of community workshop dates and locations, and offers some insight into the challenges facing Alberta's water.

Because water is a complex topic, you may choose to attend a community workshop for assistance in completing this work book. For those who are unable to attend a workshop, we have divided questions into two parts. Part A deals with the broad challenges and objectives the water strategy must address, while Part B focuses on more detailed options for water management in Alberta. You may need to reference the information book for assistance in completing Part B.

The Current Situation

In the past we have seen relatively few water management conflicts: there has been enough water to meet the demands for industrial, agricultural and population growth; economic and land use activities did not create major impacts on the amount of water or its quality; technological improvements and regulatory systems have been able to limit the impact of agricultural, industrial and municipal discharges.

But times have changed. In the last several decades we have seen significant growth in a variety of industrial and agricultural sectors, the population has grown, and recent events in Walkerton and North Battleford have raised questions on the safety of drinking water across the country.

PART A

What Are the Challenges?

Since the water strategy will address the future of Alberta's water management, some assumptions must be made about the challenges we will face in the future. Late last year, a small, diverse "ideas" group of Albertans provided the Government of Alberta their advice on water management in the province. Their input, combined with some additional research, has led to the list of challenges in the table below.

1. Review the following list of challenges. For each challenge, indicate whether you agree or disagree with the statement.

Possible Future Challenges *City of Edmonton comments: The future tense should be replace by the present tense in this question as there are already challenges and issues. If these issues are addressed proactively, they will be less of a challenge in the future.*	Agree	Disagree	Unsure
a. Water will become an increasingly scarce resource in Alberta *City of Edmonton comments: water resources will not necessarily become "increasingly scarce", but the demand on the resource will increase.*	☒	☐	☐
b. Access to safe drinking water will become a significant issue for Albertans	☒	☐	☐
c. Water availability will limit growth in Alberta *City of Edmonton comments: Industry (large scale agriculture, resource extraction, etc.) may be limited by water quantity, both surface and groundwater. Other growth will by necessity occur where water is available.*	☒	☐	☐
d. Climate change will seriously affect water flows in Alberta *City of Edmonton comments: An identified climate change risk for Alberta is more variability in precipitation, which may impact water flows.*	☒	☐	☐
e. Industrial and agricultural growth will create greater demands for water – not always in places where water is plentiful	☒	☐	☐
f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth *City of Edmonton comments: A sustainable strategy will need to protect aquatic ecosystems while fostering economic develop.*	☐	☒	☐
g. Surface water and groundwater will be vulnerable to pollution and contamination	☒	☐	☐
h. Flooding will pose a threat to human safety and create potential damage and economic costs *City of Edmonton comments: This is mainly because we have built in or altered floodplains.*	☒	☐	☐
i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important	☒	☐	☐
j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure	☐	☒	☐

2. Of these challenges, please indicate the three most important for the Government of Alberta to address: ☐ a. ☐ b. ☐ c. ☐ d. ☐ e. ☐ f. ☒ g. ☒ h. ☒ i. ☐ j.
City of Edmonton comments: A comprehensive strategy would need to deal with all of the above challenges.

3. Are there any additional challenges that should be considered?

Strategic

- Comprehensive basin watershed planning (the most effective time to do this is prior to water issues becoming critical, at which time there may be limited management options available).
- Urban/local watershed planning.
- Effective process for the implementation, maintenance and monitoring of watershed plans, including addressing non-compliance issues.
- Long–term sustainable funding for water management.

Specific

- Deep well oil recovery using surface water (this is truly a consumptive use as this water is lost).
- Approach to deal with emerging issues such as deep well waste disposal, endocrine disrupting substances, etc.
- Nutrients and other water impacts from intensive livestock operations.

What Objectives Should Guide A Future Water Strategy?

The "ideas" group identified four fundamental objectives for the water strategy.
They are to ensure Alberta has:

- ➢ Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater)
- ➢ A safe, secure drinking water supply
- ➢ Reliable, quality water supplies for a sustainable economy
- ➢ The knowledge necessary to make effective water management decisions

Alberta's water strategy will assist the Government of Alberta to make wise water management decisions, now and in the future.

4. Do you agree these objectives should guide Alberta's water strategy? ☒ Yes ☐ Not Sure ☐ No

If no, what would you change or add?

An additional key objective may be the development of watershed management plans that address the varying and potentially conflicting needs.

PART B

Achieving Safe Secure Drinking Water

Private Water Systems

Private water systems are typically found in rural areas. Because of the distance between households, it is generally too expensive for these property owners to connect to a municipal drinking water system. Therefore, approximately 600,000 Albertans get their drinking water from a source other than an approved water treatment facility. They get their water by drilling into the ground, using a lake or river, or by hauling water in by truck and storing it in large holding tanks. Sometimes a group of rural residents will establish a water co-operative that provides untreated water to its members.

5. Do you get your water from your own private system? ☐ Yes ☒ No

6. Because private systems fall outside Alberta Environment's approval process, the safety of private water supplies can not be guaranteed. Currently, the property owner is responsible for ensuring his or her own water quality and quantity.
City of Edmonton comments: not applicable.

Considering this, please review the options in the table below. For each option, indicate: **1=Property owner's responsibility, 2=Shared responsibility between the property owner and the provincial government, 3=Provincial government's responsibility.**

Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Private Water Systems	Implications to Consider	Whose Responsibility?		
Monitor the quality and safety of the water supply for private water systems	A single water sample costs between $50 and $150 to analyze, depending on the type of analysis	☐ 1	☐ 2	☐ 3
Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences	A recent project is estimated to cost $32 million to supply 500 rural families with water. Developing regional water systems is not feasible everywhere	☐ 1	☐ 2	☐ 3
Develop individual water supplies (e.g. well drilling, dugout construction, water hauling)	A well costs $5,000 to $15,000. A dugout costs $3,000 to $5,000. Hauling water costs $600 to $2,000 annually	☐ 1	☐ 2	☐ 3
Pump water from distant sources to dugouts during times of drought	Pumping costs vary greatly depending on the distance from the new water source. Assumes that another source is available within a reasonable distance	☐ 1	☐ 2	☐ 3

Small Municipal Systems

Towns, villages, hamlets and municipal developments often find it difficult to pay for the construction and operation of water facilities. They also find it difficult to train and keep staff to operate these facilities.

7. Do you get your water from a small municipal system? ☐ Yes ☒ No

8. Alberta Environment currently sets and enforces drinking water standards for every Alberta municipality, reviews the water quality reports prepared by each municipality, and certifies the facility operators. Small municipal systems, however, are still more vulnerable to possible contamination as they are less able to invest in new technologies and overall improvements to their water treatment facilities.
City of Edmonton comments: not applicable.

   Considering this, please review the options in the table below. For each option, indicate whether it should be implemented, and if so, by whom: **1=Municipality's responsibility, 2=Shared responsibility between the municipality and the provincial government, 3=Provincial government's responsibility.**

   Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Small Municipal Systems	**Implications to Consider**	**Whose Responsibility?**		
Supply technical advice to small municipalities about facility operations, maintenance and monitoring	These services could be purchased from private firms or provided as a service of the provincial government	☐ 1	☐ 2	☐ 3
Monitor the quality and safety of water at small water treatment plants	This monitoring could be done by the municipality, consultants orprovided as a service of the provincial government	☐ 1	☐ 2	☐ 3
Develop regional water supply systems	Provides consistent, high-quality drinking water (e.g. water from the City of Edmonton is currently provided to approximately 40 other communities as far away as Vegreville)	☐ 1	☐ 2	☐ 3

9. Do you think companies (public or private) should be allowed to invest in water systems and provide drinking water to small municipalities? ☒ Yes ☐ No

Reliable, Quality Water Supplies for a Sustainable Economy

The availability of water is a real constraint to the type, amount and location of economic growth in the province. Without sufficient water, Alberta may see significant constraints in the expansion of agriculture in the south, oil sands in the north, and petrochemical development in central Alberta. The water strategy must address the issue of water availability for continued economic growth in Alberta.

This section focuses on Alberta's economy, and striking the right balance between a sustainable economy, a healthy environment and the social well-being of Albertans.

How water is allocated in Alberta

Agricultural, industrial and municipal water users apply to Alberta Environment for a license to use a set allocation of water. Wherever possible, water is managed to provide for these users. In times of shortage, however, the most recently issued license holders are asked to shut down so that more senior license holders can be assured their allocation under the current priority system. This system is known as first in time, first in right. The older the license the higher its priority, regardless of how the water is being used.

Before water can be allocated to new users, Alberta Environment must consider three things:

a) *Aquatic environment*
   The amount of water necessary to safeguard and maintain aquatic ecosystems must be determined and preserved.
b) *Apportionment agreements*
   Alberta has made commitments to the province of Saskatchewan and the state of Montana over the amount of water that will flow into each respective jurisdiction.
c) *Existing water licenses*
   New water allocations must not impact existing licenses.

The first step in deciding how much water can be allocated is to determine the amount necessary for the aquatic environment, for apportionment agreements, and for existing water license holders. This amount is subtracted from the total amount available, the remainder can then be used for supporting the economy and for human use. Depending on weather conditions, that amount is different each year.

Under current practices, once the total amount of water available for human use and economic development has been allocated, a moratorium is placed on the river basin or groundwater aquifer and no further water is allocated. Certain basins in southern Alberta are nearing the limits of water allocation – particularly during dry periods when less water is flowing in the rivers.

In the South Saskatchewan River Basin, there is little opportunity remaining for any major operation to obtain a license to withdraw water from the basin. There is a possibility this trend will continue. Depending on unpredictable variables such as future weather patterns, we may begin to see other river basins reaching their limits of available water in the next 25 years.

10. Please review the following list of options. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional opinions in the space provided.

Options (How could we respond if river basins become fully allocated?) *City of Edmonton comments: Should be considering this before full allocation is reached. This is currently more of an issue in southern Alberta.*	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine groundwater availability throughout the province *City of Edmonton comments: A long-term plan for achieving this goal should be developed.*	Currently the provincial government does not have detailed information on the groundwater available at all locations in the province	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5
Allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin. *City of Edmonton comments This is related to "setting aside water for future population growth" and is part of a water management plan.*	Newer (junior) license holders are at risk during dry periods. No allowance for future population or economic growth. Potential pressure on aquatic ecosystems.	☐ 1	☐ 2	☒ 3	☐ 4	☐ 5
Allocate water based on its most beneficial, or valued, uses *City of Edmonton comments: Assuming ecological integrity is maintained, who decides these next values?*	There are many views on which water uses have the most "value"	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5
Allocate water to further uses even if this potentially harms aquatic environments	Aquatic habitats and species may be adversely affected to achieve further economic development	☒ 1	☐ 2	☐ 3	☐ 4	☐ 5
Set aside water for future population growth before there are any shortages *City of Edmonton comments: In either case, this should be part of a water management plan with a focus on water conservation.*	Current generations will have to live with limitations on water availability to allow for future population growth	☐ 1	☐ 2	☒ 3	☐ 4	☐ 5
Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)	Has been used in Alberta and elsewhere to solve water shortages	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5
Encourage more efficient use of water through pricing to reduce overall use *City of Edmonton comments: Free trade implications would need to be considered.*	Users who can create the greatest value from their water allocation will provide more economic benefits	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5

Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations	Reservoirs are often expensive to construct and they flood lands. Reservoir water can stimulate economic growth and reservoirs and their outflows can support aquatic habitats	☒ 1	☐ 2	☐ 3	☒ 4	☐ 5
Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)	Little information exists on the costs. Such a system hasbeen proposed for many years to supply water from the North Saskatchewan River to the heavy oil industry in the Cold Lake Region	☒ 1	☐ 2	☐ 3	☐ 4	☐ 5
Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)	There may be ecological consequences. Little information exists on the costs	☒ 1	☐ 2	☐ 3	☐ 4	☐ 5
Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods	Does not address the risk of all water users. Individuals who have not stored water will continue to be at risk during low flows	☐ 1	☒ 2	☐ 3	☐ 4	☐ 5
Companies must obtain a water allocation approval prior to being allowed to develop	Industrial developments have proceeded without consideration to the availability of an adequate water supply only to later put pressure on government and water availability	☐ 1	☐ 2	☐ 3	☐ 4	☒ 5

Water Conservation

Water conservation refers to the planned protection, improvement, and wise use of water resources. It also includes controlling, protecting, and managing water. Water conservation may also mean improving the efficiency of industrial and agricultural water use. By generating the most efficient use of water, its overall productivity is enhanced and more water is made available for new operations. Increased water efficiency and water conservation plans also reduce the need for high cost expansions of water treatment and distribution systems.

11. Please review the following list of options for conserving Alberta's water. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree**.

Please add any additional opinions in the space provided.

Options for Conserving Water	Considerations, Possible Implications	Disagree				Agree
Establish a price for water used by industrial and agricultural operations *City of Edmonton comments: Industrial, agricultural and residential water price should be the same. Generated revenue should be reinvested in water management. May have free trade implications.*	Putting a price on any product encourages people to use the product wisely. At present, there is no charge to the operators for withdrawing water from a river, lake or groundwater	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5
Establish a price for water used by individual households *City of Edmonton comments: Industrial, agricultural and residential water price should be the same. Generated revenue should be reinvested in water management. May have free trade implications.*	Municipalities currently charge a fee for treating and distributing domestic water. At present, there is no charge to the municipality, or its residents, for withdrawing water from a river, lake or groundwater source	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5
Educate Albertans about water values and methods *City of Edmonton comments: This may be the area where best management practices are used most effectively.*	Purpose would be to create a conservation water ethic shared by all water users	☐ 1	☐ 2	☐ 3	☐ 4	☒ 5
Establish water conservation incentives (e.g. tax rebates) offered by government *City of Edmonton comments: This may be more appropriate if revenue from water pricing is used.*	May come at a cost to taxpayers	☐ 1	☒ 2	☐ 3	☐ 4	☐ 5
Set targets for water conservation for various sectors using best management practices *City of Edmonton comments: Not sure what how a target system could be used (what would happen if targets are not met?)*	Targets would provide guidance for better water use within sectors but may be difficult to set across the province and between sectors	☐ 1	☐ 2	☒ 3	☐ 4	☐ 5
Establish program to ensure water metering in all residential households.	Where water is not metered, there appears to be little incentive to take water management seriously.	☐ 1	☐ 2	☐ 3	☐ 4	☒ 5

Safeguarding Alberta's Healthy Ecosystems

Healthy aquatic ecosystems are integral to Alberta's water resources. As the province's economy and population grows, aquatic ecosystems are affected as we allocate water from natural sources to human uses. Aquatic ecosystems are also affected by changes in water quality that result from human use. The Government of Alberta adopts international quality standards and monitors some portions of aquatic systems to ensure they are not being damaged by human use.

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree**.

Please add any additional options in the space provided.

Options for Protecting Aquatic Ecosystems	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine how much water the aquatic environment requires to remain healthy *City of Edmonton comments: This should include improving methodology and advancing the science in this area.*	Without this information it is difficult to allocate water without putting the aquatic environment at risk. It is difficult to accurately quantify and protect "natural demand"	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5
Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin *City of Edmonton comments: This should fall out of the first component and this balance would not change with changing societal values.*	This is generally done within a water management plan that balances the values of society. These values may change over time	☐ 1	☐ 2	☐ 3	☒ 4	☐ 5
Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm *City of Edmonton comments: This is good in theory but difficult to quantify, assess implications and monitor. Additional research and development would be required for the appropriate implementation of this type of approach.*	Both point (pipe discharge) and non-point (runoff from land) sources of substances need to be identified and monitored. Non-point sources are difficult to measure	☐ 1	☐ 2	☒ 3	☐ 4	☐ 5
Identify sensitive aquatic environments or habitats that require additional protection	Without this information it is difficult to make management decisions putting the aquatic environment at risk	☐ 1	☐ 2	☐ 3	☐ 4	☒ 5
Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management	The activities that occur in a watershed, along with our decisions on land use, can affect aquatic systems	☐ 1	☐ 2	☐ 3	☐ 4	☒ 5
Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use	Economic development opportunities may be lost to achieve environmental protection	☐ 1	☒ 2	☐ 3	☐ 4	☐ 5
Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit other use		☐ 1	☐ 2	☐ 3	☐ 4	☒ 5

Additional Comments

Please feel free to submit any additional thoughts or ideas you may have.

- Ecological protection of our water resources needs to be the foundation of the water strategy as this is a key factor for our quality of life and healthy economy.
- Water quality and quantity are interconnected and both are related to land use.
- Due to a concerted effort over the past decades, the North Saskatchewan River water quality has improved within the City, but water quality is currently threatened due to increased activity in the watershed Research on emerging water quality and quantity issues is required
- Basin watershed planning is required:
    - ➢ there is a need to recognize regional watershed differences;
    - ➢ different management options and strategies would be identified for different basins;
    - ➢ the most effective time to do watershed planning is when there are not major water issues and there are management options available; and,
    - ➢ process for the implementation, maintenance and monitoring of watershed plans, including addressing non-compliance issues.
- Inter-basin transfer of water is not sustainable. The City supports the current policy of not allowing inter-basin transfers.
- Education on source control for private citizens and the commercial, industrial and business sectors likely remains one of the most cost-efficient and practicable methods of improving water quality.
- In addition, an aggressive approach to water conservation can help to address water quantity issues.
- Research on emerging water quality and quantity issues is essential (e.g. endocrine disrupters).
- There is a need to define what is meant by "agricultural":
    - ➢ Intensive livestock operations are an industrial/commercial use.
- It is difficult to define sensitive aquatic environments and what may or may not result in an adverse impact.
- For water pricing, there is a need to recognize the difference between use (where water is returned to its source) and consumption (where it is not returned).
- There may be many ways to identify ecosystem health, which are not identified in this strategy.
- There is need for provincial leadership on water quality and quantity issues as well as floodplain management.

Respondent Information

The final questions are for our statistical calculations only.

1. Where do you live? (please check one and provide name)

☒ City

☐ Town

☐ Village, Hamlet

☐ Rural Resident (provide name of nearest community)

☐ Metis Settlement

☐ Indian Reserve

☐ Other

2. What is your postal code? T5J 2R7

3. Are you answering this questionnaire as…

☐ A private citizen

☐ A group or organization (please name the group)

☒ A local government (please name the community)
City of Edmonton

☐ A private company (please name the company)

☐ Other

If you have answered this work book on behalf of a group, local government or company, please feel free to complete an additional work book as a private citizen.

4. If you would like to be added to Alberta Environment's mapping list, please submit your name and address. (optional)

City of Edmonton
Office of the Environment
2nd Floor, Century Place
9803 – 102A Avenue
Edmonton, AB T5J 3A3

FEDERATION OF ALBERTA NATURALISTS
11759 - Groat Road, Edmonton AB T5M 3K6

April 8, 2002

To: Equus Consulting

water for life
sub-report 1, section d: other submissions

From Dennis Baresco, President
Federation of Alberta Naturalists

24. Federation of Alberta Naturalists

Re: Comments on *Water for Life* Initiative

Developing a water strategy for Alberta is laudable. Even without the uncertainties created by human-induced atmospheric change, plans and strategies for water use make sense and are decades overdue. Thus, the Water for Life initiative by the Government of Alberta could be praiseworthy if decision-makers are objective and committed to an appropriate balance of environmental, economic and social needs. Without that committment and balance, the initiative is somewhat suspect, and the Federation of Alberta Naturalists' comments (below) reflect our concerns that the initiative itself may be deliberately avoiding the ethical balance.

1. River Basin Advisory Groups are meeting across the province and making recommendations on each one's particular basin. We question why the Water for Life initiative is plowing ahead without the benefit of the Advisory Groups' recommendations, especially given that Water for Life states emphatically how knowledge is so necessary "to make effective water management decisions."

2. Water management and needs determination is extremely complex. Yet the initiative has been hurried and fast-tracked to the point that either: a) the resulting strategy may be more knee-jerk than wise management; or b) most of the strategy has already been decided.

3. The workbook questions do not reflect the intricacies, complexities and inter-relationships of water management; in fact, the questions simplify the issue almost to the point of the results being meaningless. Responses of "yes", "no", or "unsure" are woefully inadequate when the answer may change dramatically depending on the circumstances relative to other questions.

4. As per # 3 (above), most people, without an understanding of the complexities, will be limited to knee-jerk guesswork for their answer. The results, then, will supply only an indication of what people think, irrespective of any validity. Any water experts filling out the workbook could not possibly limit answers to yes/no/unsure, which makes the questions virtually irrelevant for them.

For example, Part a, Q. a: "Water will become an increasingly scarce resource in Alberta." Considering all the preliminary media hype, much of it coming from the same government department conducting Water for Life, about the shortage of water and how it will become an increasingly scarce resource in Alberta, it doesn't take much imagination to guess how most people are going to reply, given only yes/no/unsure as choices. But scarcity depends on conservation, management, use and abuse, definitions of need, etc., etc.

5. All the answers in the first part are phrased in such a way to elicit an "agree" response, a not-very-subtle bit of manipulation. They appear to be designed to cause public apprehension, not elicit thoughtful response. Perpetrating the either/or myth (f. "Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth") is particularly disdainful.

6. While "sustainability" is a stated objective, "growth" appears to be the main focus of the need for a water strategy, especially growth in industries heavily dependent on water. Nowhere is it pointed out that, as individual concepts, sustainability and growth bear little in common. As well, there is no recognition of sensible limits. For example, "Without sufficient water, Alberta may see significant constraints in the expansion of agriculture in the south . . . ." Since the south is semi-arid, of course there will be constraints, much the same as there are constraints to year-round sunbathing in Fort McMurray.

7. It is now generally acknowledged that Alberta's fishery is in almost complete collapse. Amazingly, fishing is mentioned only as a positive pastime.

Given all the above, the Federation of Alberta Naturalists believe that Water for Life, despite its heady title, is mostly a strategy to pursue growth at any cost. At times, it is deliberately deceptive. The motivation appears to be, not the wise use of water, but rather the expansive use of every drop of water.

We strongly support any initiative that seriously and honestly looks for ways to maintain an appropriate balance of environmental, economic and social needs regarding water, and we will gladly take part in any such initiative. "Water for 'Growth'" isn't it.

Sincerely

Dennis Baresco, President
Federation of Alberta Naturalists

PE

25. Bow River Basin Council

Bow River
BASIN
Council

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T2X 1P1

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April 19, 2002

Mr. Bill McMillan, Partner
Equus Consulting Group Inc.
250, 9707 – 110 Street NW
Edmonton AB
T5K 2L9

Dear Mr. McMillan

Subject: The Bow River Basin Council's Submission on The Provincial Water Strategy

In accordance with our discussion last Friday (April 12) I am enclosing the Council's submission covering the captioned subject. There is a completed Workbook along with some accompanying notes.

We had a very good meeting and a lively discussion. Dru Mohler a Community Development Officer with Alberta Community Development coached me and prepared me to facilitate the workshop. I would have a long way to go to match your skills, but Dru was very helpful and the success we achieved is largely a function of his help and mentoring. We attempted to, and did, cover a lot of ground in our relatively short 4 hours. Without a doubt we could have used more time, but we set about to accomplish as much as we could in the time allotted. I have tried to distill the information as much as possible as I know you have received an overwhelming response to this initiative. I trust it is all pretty self-explanatory. However, if you have any questions or if I can do anything to help, please let me know. If it is helpful, I will gladly provide our 8-page written submission in an MS Word file. I also have our completed workbook as a .pdf file.

Thank you very much for your patience. We remain grateful for the opportunity to participate in this initiative and we eagerly await your results and the next steps.

Yours truly,

Mark Bennett, B.Sc., MPA
Executive Director

Enclosures (2)

Special Meeting to Discuss the Province's Water Strategy
April 3, 2002 : 13:00 to 17:00
TransAlta Auditorium

Background:

At the Bow River Basin Council's regularly scheduled Spring Forum (March 13, 2002) there was considerable support amongst the members for convening a special meeting in order to provide a BRBC response to the Water Strategy, in particular the Workbook. Therefore the objective was to go through the workbook and provide the Minister with advice for a provincial water strategy (i.e., Council's response to workbook)

Twenty-seven members of the Council were present at the Special Meeting along with Sarah Hamza, BRBC Administrator (recorder) and Mark Bennett, BRBC Executive Director (facilitator). In addition, two members who were not able to attend provided written submissions.

Introduction:

In this group there was some cynicism about the process and the workbook, but in general the government's efforts at seeking public input were recognized and appreciated. Furthermore, the idea of developing a strategy overall is very well received and the government is commended for the initiative. Throughout the deliberations one clear question emerged.

Where does water fit into the Alberta advantage? Is water a priority?

At the outset there were 3 posters visible which were intended to provide some guidance for the workshop participants. The posters provided; a) the BRBC vision statement, b) the BRBC Mandate, and c) a working definition of how to reach a consensus. These are provided as Attachment No. 1. Members present were encouraged to measure their responses by the vision and mandate. It was suggested that having a slightly different answer as a Council member from that which they may have individually was not a bad thing. Presumably there has been an overwhelming response from individuals to the strategy. The BRBC feels that in providing a group response, it may be beneficial to see what a consensus may look like.

Alderman Barry Erskine, 1st Vice-Chair of the Council, brought the meeting to order at 13:15. Participants introduced themselves and were asked what they hoped to achieve in this workshop session. What were their expectations?

- This process (the workshop) may help to illuminate any key areas missing (e.g. source/ headwaters protection).
- Arrive at better understanding of what the problems are.
- Ensure provision of good monitoring, dissemination of information, and the use of it in decision-making.
- Conservation of water use, particularly for industry.
- Perhaps as a result of this process Government can be more responsive to watershed groups.

- Made in Alberta strategy.
- Would like to see the Bow River Basin Council reach consensus on water quality and quantity issues.
- Hopefully the strategy will lead to long-term sustainability of water quality and quantity for everyone, including wildlife. (This is part of the BRBC's mandate)
- That the Water Strategy will lead to an elevated profile for water and then associated problems, as identified, can be addressed.
- Through these deliberations and the resultant strategy we can get clarification on real issues vs. perceived issues.
- Appropriate priority setting.
- Comments that we agree on may carry more weight.

What general comments were there?

- Get the feeling from workbook that there is more water than there really is.
- Watershed management and a water strategy are more than just the river and water.
- Concern with maintaining the health of the entire ecosystem (not just aquatic).
- Not mapping aquifers (and a general lack of information) is a concern.
- Concern over how info package was distributed. Who was targeted? (This concern came from an elected public official who had not received a package. This individual is a BRBC member)
- Water is a finite resource and may be shrinking due to climate change. Need to live within our means. All stakeholders and the public must be educated that water is not an infinite resource.
- Would like to see more unification of various water initiatives being undertaken. (e.g. The Water Strategy and the South Sask. River Basin Water Management Plan).
- What's the government's agenda? How are we supposed to interpret what appear to be slanted questions, or missing things?
- There is a significant concern about the implementation of a strategy. The government, with the help of the public, may develop a first-rate strategy but what assurance is there, that it will be implemented. Many members are deeply concerned about the current resource levels for water management. It is difficult to imagine a comprehensive strategy being adequately supported with current resource levels.

PART B

Participants chose to go through Part B first. Through a self-selection process four sub-groups formed, one group to address each of the major points in the section (referred to by the Minister as the 4 pillars determined by the Ideas Group).

Response Notes:

Safe Drinking Water

Part B Group I 6b) – This question focuses exclusively on the rural context (without that being defined), there was some discussion of the "rurban" areas which constitute the urban / rural interface (including acreages) and in some regions are experiencing considerable development.

Part B Group I 6c) – Government needs to supply information on availability of ground water. Much more needs to be known about our ground water resources. Evidently some information is currently being compiled by PFRA. This needs to be shared and integrated with other data sources.

Part B Group I 6d) – This question generated some discussion. It was felt that generally people exercise some choice in where they choose to live and what activities they pursue. Nevertheless, clearly the operative phrase is "during times of drought" and exactly how this is

defined (crisis vs. normal or acute vs. chronic situations). Consideration of this question suggested 2 fundamental questions that need to be answered.

- What exactly is the role of government in our communities?
- Is the moving of water from here to there really feasible (ecosystem concerns)?

Part B Group I 6e) – The issue of the "rurban" belt surrounding major populated centers was discussed again. These areas should have regional treated water, a responsibility shared by all three; the individual, the municipality and the provincial government).

Part B Group I 9) – Due to the way this question is worded, it could not be answered. In some respects private companies are already involved in water supply. Importantly, there is considerable concern about any actions, which will further "commodify" water. There is the feeling that the implications with respect to NAFTA may be very important.

Water Quality

The group that looked at the second part of Section B did not answer the questions in the workbook, with the notable exception of 10j. This group strongly disagreed with the notion of open diversions, largely due to the potential for very serious ecosystem consequences. The clear message from this group (and there was an overall consensus) is Do not consider inter-basin transfers.

They chose instead to offer some additional comments / questions.

Part B Group II Additional

1. A critical omission in this section was the absence of any discussion of headwaters protection. The protection, preservation and enhancement of source head waters means a sustainable flow in the rivers and the watershed; without a flow there is no river, no aquatic ecosystem, no riparian fringe, no water for recreation, no water for agriculture and no water to drink. Supply is paramount, i.e. no clear cut of head water source. The EPA notes:
   "Preventing drinking water contamination at the source makes sense:
   - good public health sense;
   - good economic sense; and
   - good environmental sense."

   Population, agriculture and industry is limited by potential water supply thus preservation and enhancement of source head waters. Strategy should use and encourage use of treatment wetlands and riparian buffer zones to preserve source quality. Also we should map source headwater's supply to prevent compromise of source supply.

2. More ground water information is required. This is essential for protection etc.

3. The water strategy should be developed to prevent a crisis point from being reached, which will inevitably lead to a reduction in quality of life.

4. While this strategy is a Provincial initiative, there should be an acknowledgement that that water management is an issue on a global scale as well. While we are not asked to address the issue at that level we should recognize that what we do is part of a much bigger picture..."Think globally, act locally".

Water Conservation

This group did choose to answer the questions in the workbook. They also formulated a number of general comments. These involve, in part, issues or questions that the group felt were left out of the discussion.

Part B Group III General – The group offers the following general comments.

- In some situations Alberta Environment may have different semantics than the general public. As a result and because of this, some of the questions are difficult to understand and the respondent may not know what assumptions the drafters of the question made.
- While it is mentioned in the workbook's preamble to question 11, there needs to be more emphasis on the fact that water conservation is simply using less (although this is important). Conservation also means that water needs to be used as effectively as possible.
- There is no mention of using monitoring to evaluate the effectiveness of conservation measures.
- There is no mention of reuse as a conservation strategy.

Part B Group III 11a) – It is important that the distinction between the value of water and the price of water be made. There is some uncertainty as to whether pricing water would encourage conservation (looking at the example of gasoline, rarely do price increases stimulate dramatic conservation efforts). Metering may have more to do with conservation since it provides information that allows the consumer to understand how much water they are using. If water were priced this would have to be in addition to the current conveyance costs.

Part B Group III 11b) – Water pricing for individual households is viewed as essentially being a "royalty" or a tax on water. As in point 11a (above) there is no consensus that this will actively promote conservation. In fact, the group was of the opinion that in many industrial, agricultural and other non-residential water uses, pricing of water could prevent licensees or users from having the money to make improvements to their water handling/management systems.

Part B Group III 11c) – There is a very strong agreement that education is probably the most effective tool available for promoting conservation. It is felt that the areas of education and developing an informed public might achieve the highest and quickest response to conservation initiatives. People need to be supported and encouraged to develop a conservation ethic.

Part B Group III 11d) – Incentives should include more than economic instruments. Positive peer pressure, public recognition of accomplishments, will do more to make sure conservation is practiced than by focusing so much on financial incentives that would generate money with no assurance of conservation.

Part B Group III 11e) – While considering targets and best management practices, the group discussed some of the new tools in the Water Act, like transfers, assignments, etc. and thought they should be given some chance to achieve positive results before moving to what was seen as "punitive" measures to reduce use [not to conserve].

Healthy Ecosystems

This group posited that protection of ecosystem is (or should be) the number 1 priority in any strategy. Basically everything flows from there as you can't separate water from ecosystem. If you protect the ecosystem the other aspects (issues) alluded to in the questions will be taken care of. A fundamental problem in this discussion is that water is being considered separate from the land

Part B Group IV 12a) – Referring to only the aquatic environment in this question presents too narrow a focus. Therefore, the strategy should focus on the whole ecosystem and not just the 'aquatic environment'.

Part B Group IV 12b) – The group was unable to agree on a response to this question. The water strategy should not assume that ecosystem protection and economic development are mutually exclusive. The relationship, however, is extremely complex. We need an integrated watershed-planning model, in keeping with contemporary trends for integrated resource management. The strategy needs to start with premise that economic growth may not be sustainable. Growth has to be managed. Aquatic environment protection should come first and then economic growth can be considered, to the limit that these protection levels allow. There is a balance that can be achieved and maintained but it will involve establishing some clear priorities. The notion of changing societal values introduces difficulty in planning for a moving target.

Part B Group IV 12c) – This is a question (or response) in need of qualifiers. The basic philosophy of understanding limits and carrying capacities is very sound. We have to understand loading maximums. However, there is a danger and consideration of this matter should not be construed to promote a "license to pollute". Consideration of this question highlights the need for baseline data. Baseline can be established for existing ecosystems. In some river reaches and other water bodies we may be already exceeding what is harmful. Also, putting "harmfulness" ahead of baseline data what is an acceptable guideline for the water body – water bodies need to be evaluated and independent criteria established for each water body. With accurate baseline data we can determine how much harm is being done currently. How much more harm can be sustained in the specific water body?

Part B Group IV 12d) – While protecting ecosystem is important, trade-offs for economic growth and human use may be necessary. Of course not everyone will necessarily agree to trade-offs. Each ecosystem needs its own evaluation of what trade-offs may be necessary and possible.

Part B Group IV 12e) – This is the number 1 priority. There is very strong agreement on this point.

Part B Group IV 12f) – What we should strive for is a fairly important philosophical shift. Humans shouldn't compete with other organisms for resources (water) but must share them. We should understand and accept that survival of "fish" is integral to survival of human kind. While most creatures are resilient, we should respect their needs along with our own.

Part B Group IV 12 Additional – Another important need is education. All levels of government should actively promote this. Municipalities should be mandated to teach residents about water issues.

PART A

As a result of the self-selection process followed to address Part B it was evident that the priority "challenges" are those dealing with ecosystem protection. Having said that, all of them are recognized as important. The group struggled with Part A. In general the concerns were reflected in the following comments.

1. Are these all "challenges" or, are they existing realities?
2. Along the same line, why do they all have the future tense "will". There is a fairly common belief that some of these factors may be present today, right now.
3. In answering these points, is the respondent to assume the status quo continues? Are we going to keep developing and growing at current rates?

The group found it very difficult to answer this section. After establishing the noted qualifiers above, there was a lot of discussion on each point. The "challenges" were judged to have significant ambiguity. It was difficult to agree on what each meant, so therefore the group was unable to agree of disagree with the statement. There should be an explanation of the intent of each statement before they can be answered.

Response Notes

Part A 1a) – On average the total amount of water hasn't changed (First law of thermodynamics). There is, however, regionally increasing competition for what water there is. It is more difficult to agree with this statement on a province-wide basis than it would be regionally or on a per capita basis.

Part A 1c) – As with the first statement, this one must be qualified in a regional context. The current patterns in the province tend to show that the areas of greatest growth do not have an abundance of water.

Part A 1f) – While the group was unable to answer this question there was a clear restatement of the earlier assertion that sustainable ecosystems and economic growth should not be viewed as mutually exclusive (as this challenge seems to suggest). The strategy must promote the idea of balance and sharing, not competition.

Part A 1i) – The group judged this as an extremely important statement and was able to agree with it. However, it is not a question of knowledge and information becoming important they are important right now.

What's missing from the workbook?

- No real discussions of how current regulatory instruments have enough teeth, but are not being enforced. Could be doing better job of implementation of existing legislation. A management strategy should involve the implementation of existing legislation. Needs to be full integration of policies, and even departments. Reduce regulatory confusion.
- Lack of attention to recreational use. Limited discussion of deleterious uses.

- Document seems to imply that everything is on the table. Would like to think that some things aren't up for discussion. It would be nice to have that distinction made. What is negotiable and what isn't?
- Improved sewage treatment is not mentioned.
- There needs to be an acknowledgement that growth ultimately has to be restricted.
- No discussion on what could be done by individuals (micro) or large urban centers (macro). There needs to be a broader scale to the discussion.
- p. 10 – Government of Alberta adopts international quality standards. However, apparent emphasis on standards is only one part of triangle – We also need world-class enforcement and monitoring.
- Discussion of industrial use of water in terms of quantity, but not quality, especially in the ex-urban context.
- A greater discussion of agriculture and water quality, all aspects of water quality.
- Require an emphasis on headwaters and forestry.
- Tried to deal with water separate from land use planning (municipal development plans, bylaws). The two are connected.
- The initiative does not currently present enough information to make informed decisions. The information handbook distributed with the workbook is good and useful, but on presents cursory detail on many very important issues.
- Want a complete map of water resources in province (aquifers, surface water). Needed as part of the knowledge necessary to make effective water management decisions (p. 3, objective 4).
- Small acreages and their cumulative effects are overlooked.
- Need bigger picture thinking (integrated plans) – looking at longer time.
- Only 0.04% of water is used for wildlife management. Other ecosystem uses comprise a further 2.42% (Water for Life Information). Is that going to be looked at within the strategy? Will the strategy consider whether the current distribution (levels) of use are appropriate?
- Emphasis on the need for indicators of ecosystem health.
- There should be a much greater emphasis throughout the document (and the process) on education and public information initiatives. In water management, a well-informed public will be a invaluable asset and an essential element of any successful strategy.
- There is no mention in the workbook and little mention in the information book about large scale Confined Feeding Operations. These are a very important concern (for some people) in the consideration of water quality challenges.
- Similarly, the effects that the oil and gas industry have on water management seem to be downplayed. Especially given the apparent emphasis on irrigation.

Attachment No. 1

Council's Vision Statement

"The waters of the Bow River Basin will be conserved and protected as a fragile and unique resource and recognized as our lifeline. Multiple uses will be balanced, ensuring the needs of all stakeholders are met, while recognizing that a healthy ecosystem is paramount."

Council's Mandate

Improvement and protection of the Bow watershed for multiple uses, considering:

- Riparian zones
- Aquatic ecosystems
- Quality and quantity of water, and
- Effects of land use on groundwater and surface water

Reaching Consensus

"70% Agreement & 100% Commitment"

"I have had a chance to express my views and/or my feelings. I believe that I have been heard and understood. If I were on my own, I would agree with this decision at least 70% of the way. Since I have had the opportunity to influence others and truly feel that they understood what I think/feel, I will be 100% committed to this group's decision." (David Lewis, 2001)

Bow River Basin Council

BOW RIVER BASIN COUNCIL

water for life

seeking fresh ideas

work book

Alberta

part ⓐ

what are the challenges?

Since the water strategy will address the future of Alberta's water management, some assumptions must be made about the challenges we will face in the future. Late last year, a small, diverse "ideas" group of Albertans provided the Government of Alberta their advice on water management in the province. Their input, combined with some additional research, has led to the list of challenges in the table below,

1. Review the following list of challenges. For each challenge, indicate whether you agree or disagree with the statement.

	Possible Future Challenges	**Agree**	**Disagree**	**Unsure**
* a.	Water will become an increasingly scarce resource in Alberta	☑	☐	☐
b.	Access to safe drinking water will become a significant issue for Albertans	☑	☐	☐
** c.	Water availability will limit growth in Alberta	☑	☐	☐
d.	Climate change will seriously affect water flows in Alberta	☐	☐	☐
e.	Industrial and agricultural growth will create greater demands for water – not always in places where water is plentiful	☐	☐	☐
*** f.	Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth	☐	☐	☐
g.	Surface water and groundwater will be vulnerable to pollution and contamination	☑	☐	☐
h.	Flooding will pose a threat to human safety and create potential damage and economic costs	☐	☐	☐
**** i.	Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important	☑	☐	☐
j.	Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure	☐	☐	☐

2. Of these challenges, please indicate the three most important for the Government of Alberta to address: ☐ a. ☐ b. ☐ c. ☐ d. ☐ e. ☐ f. ☐ g. ☐ h. ☐ i ☐ j

3. Are there any additional challenges that should be considered?

* Please see Part A 1a) Note

** Please see Part A 1c) Note

*** Please see Part A 1f) Note

**** Please see Part A 1i) Note

what objectives should guide a future water strategy?

The "ideas" group identified four fundamental objectives for the water strategy. They are to ensure Alberta has:

- Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater)
- A safe, secure drinking water supply
- Reliable, quality water supplies for a sustainable economy
- The knowledge necessary to make effective water management decisions

Alberta's water strategy will assist the Government of Alberta to make wise water management decisions, now and in the future.

4. Do you agree these objectives should guide Alberta's water strategy? ☑ Yes ☐ Not Sure ☐ No

If no, what would you change or add? Note: The four listed are not assumed to be in order of priority

part b

achieving safe secure drinking water

Private Water Systems

Private water systems are typically found in rural areas. Because of the distance between households, it is generally too expensive for these property owners to connect to a municipal drinking water system. Therefore, approximately 600,000 Albertans get their drinking water from a source other than an approved water treatment facility. They get their water by drilling into the ground, using a lake or river, or by hauling water in by truck and storing it in large holding tanks. Sometimes a group of rural residents will establish a water co-operative that provides untreated water to its members.

5. Do you get your water from your own private system? ☐ Yes ☐ No

6. Because private systems fall outside Alberta Environment's approval process, the safety of private water supplies can not be guaranteed. Currently, the property owner is responsible for ensuring his or her own water quality and quantity.

Considering this, please review the options in the table below. For each option, indicate:

1=Property owner's responsibility, 2=Shared responsibility between the property owner and the provincial government, 3=Provincial government's responsibility.

Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Private Water Systems	**Implications to Consider**	**Whose Responsibility?**
Monitor the quality and safety of the water supply for private water systems	A single water sample costs between \$50 and \$150 to analyze, depending on the type of analysis	1 [✓ 2] 3
Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences See Part B Group 1 6b Note	A recent project is estimated to cost \$32 million to supply 500 rural families with water. Developing regional water supply systems is not feasible everywhere	1 [✓ 2] 3
Develop individual water supplies (e.g. well drilling, dugout construction, water hauling) See Part B Group 1 6c Note	A well costs \$5,000 to \$15,000. A dugout costs \$3,000 to \$5,000. Hauling water costs \$600 to \$2,000 annually	[✓ 1] 2 3
Pump water from distant sources to dugouts during times of drought See Part B Group 1 6d Note	Pumping costs vary greatly depending on the distance from the new water source. Assumes that another source is available within a reasonable distance	[✓ 1] 2 3
Add your own example... See Part B Group 1 6e Note		1 2 3
Add your own example...		1 2 3

Small Municipal Systems

Towns, villages, hamlets and municipal developments often find it difficult to pay for the construction and operation of water facilities. They also find it difficult to train and keep staff to operate these facilities.

7. Do you get your water from a small municipal system? ☐ Yes ☐ No

8. Alberta Environment currently sets and enforces drinking water standards for every Alberta municipality, reviews the water quality reports prepared by each municipality, and certifies the facility operators. Small municipal systems, however, are still more vulnerable to possible contamination as they are less able to invest in new technologies and overall improvements to their water treatment facilities.

   Considering this, please review the options in the table below. For each option, indicate whether it should be implemented, and if so, by whom: **1=Municipality's responsibility, 2=Shared responsibility between the municipality and the provincial government, 3=Provincial government's responsibility.**

   Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Small Municipal Systems	***Implications to Consider***	***Whose Responsibility?***
Supply technical advice to small municipalities about facility operations, maintenance and monitoring	These services could be purchased from private firms or provided as a service of the provincial government	1 2 [✓ 3]
Monitor the quality and safety of water at small water treatment plants	This monitoring could be done by the municipality, consultants or provided as a service of the provincial government	1 [✓ 2] 3
Develop regional water supply systems	Provides consistent, high-quality drinking water (e.g. water from the City of Edmonton is currently provided to approximately 40 other communities as far away as Vegreville)	1 [✓ 2] 3
Add your own example...		1 2 3
Add your own example...		1 2 3

9. Do you think companies (public or private) should be allowed to invest in water systems and provide drinking water to small municipalities? ☐ Yes ☐ No

Please see Part B Group 1 9) Note

reliable, quality water supplies for a sustainable economy

The availability of water is a real constraint to the type, amount and location of economic growth in the province. Without sufficient water, Alberta may see significant constraints in the expansion of agriculture in the south, oil sands in the north, and petrochemical development in central Alberta. The water strategy must address the issue of water availability for continued economic growth in Alberta.

This section focuses on Alberta's economy, and striking the right balance between a sustainable economy, a healthy environment and the social well-being of Albertans.

How water is allocated in Alberta

Agricultural, industrial and municipal water users apply to Alberta Environment for a license to use a set allocation of water. Wherever possible, water is managed to provide for these users. In times of shortage, however, the most recently issued license holders are asked to shut down so that more senior license holders can be assured their allocation under the current priority system. This system is known as *first in time, first in right*. The older the license the higher its priority, regardless of how the water is being used.

Before water can be allocated to new users, Alberta Environment must consider three things:

a) *Aquatic environment*
   The amount of water necessary to safeguard and maintain aquatic ecosystems must be determined and preserved.

b) *Apportionment agreements*
   Alberta has made commitments to the province of Saskatchewan and the state of Montana over the amount of water that will flow into each respective jurisdiction.

c) *Existing water licenses*
   New water allocations must not impact existing licenses.

The first step in deciding how much water can be allocated is to determine the amount necessary for the aquatic environment, for apportionment agreements, and for existing water license holders. This amount is subtracted from the total amount available, the remainder can then be used for supporting the economy and for human use. Depending on weather conditions, that amount is different each year.

Under current practices, once the total amount of water available for human use and economic development has been allocated, a moratorium is placed on the river basin or groundwater aquifer and no further water is allocated. Certain basins in southern Alberta are nearing the limits of water allocation – particularly during dry periods when less water is flowing in the rivers.

In the South Saskatchewan River Basin, there is little opportunity remaining for any major operation to obtain a license to withdraw water from the basin. There is a possibility this trend will continue. Depending on unpredictable variables such as future weather patterns, we may begin to see other river basins reaching their limits of available water in the next 25 years.

10. Please review the following list of options. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional opinions in the space provided.

Options *(How could we respond if river basins become fully allocated?)*	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine groundwater availability throughout the province	Currently the provincial government does not have detailed information on the amount of groundwater available at all locations in the province	1	2	3	4	5
Allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin	Newer (junior) license holders are at risk during dry periods. No allowance for future population or economic growth. Potential pressure on aquatic ecosystems	1	2	3	4	5
Allocate water based on its most beneficial, or valued, uses	There are many views on which water uses have the most "value"	1	2	3	4	5
Allocate water to further uses even if this potentially harms aquatic environments	Aquatic habitats and species may be adversely affected to achieve further economic development	1	2	3	4	5
Set aside water for future population growth before there are any shortages	Current generations will have to live with limitations on water availability to allow for future population growth	1	2	3	4	5
Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)	Has been used in Alberta and elsewhere to solve water shortages	1	2	3	4	5
Encourage more efficient use of water through pricing to reduce overall use	Users who can create the greatest value from their water allocation will provide more economic benefits	1	2	3	4	5

		Disagree				Agree
Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations	Reservoirs are often expensive to construct and they flood lands. Reservoir water can stimulate economic growth and reservoirs and their outflows can support aquatic habitats	1	2	3	4	5
Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)	Little information exists on the costs. Such a system has been proposed for many years to supply water from the North Saskatchewan River to the heavy oil industry in the Cold Lake Region	1	2	3	4	5
Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)	There may be ecological consequences. Little information exists on the costs	[✓ 1]	2	3	4	5
Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods	Does not address the risk of all water users. Individuals who have not stored water will continue to be at risk during low flows	1	2	3	4	5
Add your own example... Please see Part B Group II Additional Notes.		1	2	3	4	5
Add your own example...		1	2	3	4	5

water conservation

Water conservation refers to the planned protection, improvement, and wise use of water resources. It also includes controlling, protecting, and managing water. Water conservation may also mean improving the efficiency of industrial and agricultural water use. By generating the most efficient use of water, its overall productivity is enhanced and more water is made available for new operations. Increased water efficiency and water conservation plans also reduce the need for high cost expansions of water treatment and distribution systems.

11. Please review the following list of options for conserving Alberta's water. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional options in the space provided.

Options for Conserving Water	**Considerations, Possible Implications**	**Disagree**				**Agree**
Establish a price for water used by industrial and agricultural operations	Putting a price on any product encourages people to use the product wisely. At present, there is no charge to the operators for withdrawing water from a river, lake or groundwater	[✓ 1]	2	3	4	5
Please see Part B Group III (11a) Note:						
Establish a price for water used by individual households	Municipalities currently charge a fee for treating and distributing domestic water. At present, there is no charge to the municipality, or its residents, for withdrawing water from a river, lake or groundwater source	[✓ 1]	2	3	4	5
Please see Part B Group III (11b) Note						
Educate Albertans about water conservation values and methods	Purpose would be to create a water ethic shared by all water users	1	2	3	4	[✓ 5]
Please see Part B Group III (11c) Note						
Establish water conservation incentives (e.g. tax rebates) offered by government	May come at a cost to taxpayers	1	2	3	4	[✓ 5]
Please see Part B Group III (11d) Note						
Set targets for water conservation for various sectors using best management practices	Targets would provide guidance for better water use within sectors but may be difficult to set across the province and between sectors	1	2	3	4	[✓ 5]
Please see Part B Group III (11e) Note						
Add your own example...		1	2	3	4	5
Please see Part B Group III General Notes.						
Add your own example...		1	2	3	4	5

safeguarding alberta's healthy ecosystems

Healthy aquatic ecosystems are integral to Alberta's water resources. As the province's economy and population grows, aquatic ecosystems are affected as we allocate water from natural sources to human uses. Aquatic ecosystems are also affected by changes in water quality that result from human use. The Government of Alberta adopts international quality standards and monitors some portions of aquatic systems to ensure they are not being damaged by human use.

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional options in the space provided.

Options for Protecting Aquatic Ecosystems	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine how much water the aquatic environment requires to remain healthy	Without this information it is difficult to allocate water without putting the aquatic environment at risk. It is difficult to accurately quantify and protect "natural demand"	1	2	3	4	[✓ 5]
Please see Part B Group IV 12a) Note.						
Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin	This is generally done within a water management plan that balances the values of society. These values may change over time Please see Part B Group IV 12b) Note	1	2	3	4	5
Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm	Both point (pipe discharge) and non-point (runoff from land) sources of substances need to be identified and monitored. Non-point sources are difficult to measure	1	2	3	4	[✓ 5]
Please see Part B Group IV 12c) Note.						
Identify sensitive aquatic environments or habitats that require additional protection	Without this information it is difficult to make management decisions putting the aquatic environment at risk	1	2	3	4	[✓ 5]
Please see Part B Group IV 12d) Note.						
Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management	The activities that occur in a watershed, along with our decisions on land use, can affect aquatic systems	1	2	3	4	[✓ 5]

Please see Part B Group IV 12e) Note

		Disagree Agree
Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use	Economic development opportunities may be lost to achieve environmental protection	1 2 3 4 [✓ 5]

Please see Part B Group IV 12f) Note

Add your own example... 1 2 3 4 5

Please see Part B Group IV 12 Additional Note

Add your own example... 1 2 3 4 5

additional comments

Please feel free to submit any additional thoughts or ideas you may have.

respondent information

The final questions are for our statistical calculations only.

1. Where do you live? *(please check one and provide name)*

○ City

○ Town

○ Village, Hamlet

○ Rural Resident (provide name of nearest community)

○ Metis Settlement

○ Indian Reserve

○ Other

2. What is your postal code? T2X 1P1

3. Are you answering this questionnaire as...

○ A private citizen

○ A group or organization *(please name the group)* BOW RIVER BASIN COUNCIL

○ A local government *(please name the community)*

○ A private company *(please name the company)*

○ Other

If you have answered this work book on behalf of a group, local government or company, please feel free to complete an additional work book as a private citizen.

4. If you would like to be added to Alberta Environment's mailing list, please submit your name and address. (optional)

Please return work book in the envelope provided by **April 15, 2002**. Work book is also available on-line at *www.waterforlife.gov.ab.ca*.

26. Eastern Irrigation District

EID

Eastern Irrigation District

P.O. Bag 8
550 Industrial Road
Brooks, Alberta
Canada T1R 1B2
Phone: (403) 362-1400
Fax: (403) 362-6206
Email: eid@eidnet.org

12 April 2002

RECEIVED
Client Relations Unit
Alberta Environment
APR 15 2002
AR # 3805
File #

The Honourable Lorne Taylor, Minister
Alberta Environment
#423, 10800 - 97 Avenue
Edmonton, AB
T5K 2B6

Dear Lorne:

The Board of Directors of the Eastern Irrigation District [EID] would like to commend you and the government of Alberta for taking on the task of developing a water strategy for Alberta. We agree that it is crucial to look to the future needs of water so that appropriate planning can take place now.

The EID has one of the oldest and largest diversion licenses in the province. As an organization we have developed the reputation for managing our water allocations in a manner that benefits many other uses of water including recreation, the creation and maintenance of wetland habitat, and meeting the water conveyance needs of municipalities and industry - all while providing water for irrigated agriculture production.

We have been recognized by many external organizations for our efforts. The district was an early recipient of the Blue Heron Award given under the North American Waterfowl Management Plan for our long-term work with Ducks Unlimited in integrating irrigation water management with wildlife, waterfowl and wetland requirements. The district also has been awarded the Alberta Environment Award, the predecessor to the current Emerald Awards.

We have also been directly involved in the development and support of the Bow River Basin Council, from its inception to its current operations. We remain active proponents of the need for comprehensive water management and operations planning at the river basin level. We believe that cooperative approaches to present and future water management needs can be addressed through these cooperative means.

As such, our organization is eager to participate directly in the next round of the water strategy initiative by providing representation on the Minister's planned forum. We would suggest that Mr. Earl Wilson, P. Eng., the district's manager, would be an asset to this group. The district also feels that should you wish an irrigation farmer to be part of the forum that I, or any of our directors would be able to provide positive input.

We look forward to you response and to the next phase of the water strategy initiative.

Yours truly;

Bob Chrumka
Chairman, Board of Directors
Eastern Irrigation District

"Where Water Works Wonders"

substantial study and consultation on this issue before any changes in current provincial policy/legislation are contemplated.

- AAMD&C members do very strongly and very clearly oppose any transfer of Alberta water across international boundaries, beyond the current requirements governing waterflows in river systems.

11. Options for Conserving water

- AAMD&C members generally support the establishment of a water pricing system for water used by industrial and agricultural operations. Such a system would promote conservation of water, and may also encourage development of more efficient irrigation systems and discourage the use of potable water for oilfield injection purposes.
- Some members have suggested that charging for water used for domestic purposes would also encourage more conservation, and the development and adoption of new water-saving technologies.
- AAMD&C members support educating the public about conservation techniques to preserve current water supplies.
- Establishment of water conservation incentives, and development of targets for water conservation, are generally supported by AAMD&C members.

12. Options for Protecting Aquatic Ecosystems

- The AAMD&C agrees that it is important to determine the amount and quality of water required to promote a healthy aquatic environment. A proper balance between aquatic life and requirements for human use must be determined, with water being allocated based on its most beneficial and valued use.

Thank you for inviting the AAMD&C to share our members' perspectives on these important issues. We look forward to further opportunities to work with the Government of Alberta in developing a responsible and effective water strategy for Alberta.

Yours truly,

Jack Hayden
President

JH/kal

cc. Hon. Lorne Taylor, Minister of Environment
Hon. Guy Boutilier, Minister of Municipal Affairs

27. EPCOR

EPCOR

10065 Jasper Avenue
Edmonton, Alberta
T5J 3B1 Canada

April 11, 2002

Honourable Lorne Taylor
Minister of the Environment
423 Legislature Building
10800 – 97 Avenue
Edmonton, Alberta
T5K 2B6

Re: Water for Life: Alberta's Strategy for Sustainability

Dear Minister Taylor

Thank you for the opportunity to provide input into the development of the Alberta Water Strategy "Water for Life – Alberta's Strategy for Sustainability". As an operator of Water and Wastewater Treatment Plants throughout the Province of Alberta, EPCOR is especially concerned with protecting, managing and enhancing the watersheds in this Province.

EPCOR has had a chance to review the workbook and has incorporated a summary of key areas of focus below for your consideration as this process moves forward:

- A comprehensive watershed management plan should be developed for each of the major watershed basins in the Province. These plans should recognize regional watershed differences and hence include different management options and strategies for each basin.
- Land use activities are an important component of watershed planning, however there should not be a tradeoff between ecological health and land use activities. Ecological protection of water resources needs to be the foundation of any watershed management plan as the key factor for attaining a healthy economy and quality of life.

- Adequate funding is required for the Provincial Environment Department to continue all environmental programs, especially monitoring programs. It is essential to have the information obtained from monitoring to implement effective programs. The Provincial Environment Department needs to show leadership and direction in the area of watershed management and planning.
- The Provincial Government's role in auditing, monitoring and enforcement of drinking and wastewater treatment plants should be strengthened.
- True cost accounting should be used by municipalities to accurately reflect the true cost of producing a safe supply of water in the rates they charge.
- Conservation initiatives are important and all water supplies should be metered.
- Achieving sustainability means living within your means, this would indicate that development and growth only occur in areas where the means for water supply are in place, and not in areas where infrastructure to deliver water is required.

EPCOR is interested in participating in the area of Watershed Protection and Management on the Ministerial Forum on Water.

Thank you for your consideration,

Les Gammie, Ph.D.
Director – Quality Assurance

AAMD&C .1909

ALBERTA ASSOCIATION of MUNICIPAL DISTRICTS & COUNTIES

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28. AAMD&C

May 1, 2002

Bill McMillan
Equus Consulting Group Inc.
250, 9707 - 110 St N.W.
Edmonton, AB
T5K 9Z9

Dear Mr. McMillan:

On behalf of the Board of Directors and members of the Alberta Association of Municipal Districts and Counties (AAMD&C), I am pleased to offer our response to the public consultation on the *Water for Life* workbook.

Issues relating to water supply, water use, and water management are of tremendous importance to Alberta's rural municipal governments, and to rural Albertans generally. In recognition of this fact, the AAMD&C hosted a special Issue Forum on Water Issues at our recent 2002 Spring Convention. The intent of this Issue Forum was to encourage discussion amongst our members on the key issues relating to water in Alberta, and to provide the AAMD&C with member direction on these issues. The feedback received through this Issue Forum is reflected throughout the remainder of this submission.

In the pages that follow, we have attempted to respond to most of the major issues raised within the *Water for Life* workbook, based upon direction from our member Councils. However, at the outset, it is important to emphasize the most critical messages our members have provided to us with respect to water issues:

- Rural municipal governments are strongly opposed to the use of potable water for oil field or industrial injection activities. A resolution was endorsed by AAMD&C delegates (Resolution 9-01F) at the Fall 2001 Convention that requests the provincial government to prohibit the injection of fresh and/or potable water for industrial purposes, and this message was strongly reaffirmed during the Spring 2002 Issue Forum.
- Potential contamination of water sources from urban and rural sources alike must be more carefully monitored, and enforcement activities enhanced.

- The Government of Alberta should increase its efforts to investigate new technologies to conserve water and promote more efficient use of water by industrial, agricultural and domestic activities, and should actively encourage the adoption and use of such technology.

With respect to the specific topics raised within the *Water for Life* document, we have developed the responses below based upon the discussions at our Spring Issue Forum, as well as on previous direction provided by our members through formal resolutions endorsed at prior AAMD&C Conventions:

1. *Possible Future Challenges*

   AAMD&C members have identified the following items as potential key challenges for the future of Alberta's water:

   - The availability of water is likely to become a significant problem in at least various specific regions of Alberta in the foreseeable future.
   - Access to safe drinking water is an issue of significant concern for many rural and smaller urban municipalities. In many areas, infrastructure systems are antiquated and need replacement, but the local municipality often does not have the financial resources necessary to carry out required repair and replacement activities.
   - Demands placed on water resources from industrial and agricultural operations are likely to become an increasingly difficult challenge (as noted above, our members have particular concerns with industrial use of fresh water for oilfield injection).
   - Potential contamination of water supplies will become of increasing concern. Run-off generated from urban centers, industrial and agricultural operations that contains pesticides, herbicides, road salt chemicals, high fecal counts, manure and/or improperly treated sewage must be prevented from tainting ground or surface water sources.
   - Enforcement of the Water Act requirements protecting Alberta water sources, and also dealing with drainage activities, will be increasingly important. Our members have shown their clear support for enhanced enforcement activities through their endorsement of Resolution 16-99F, which urges the provincial government to increase resources to more properly enforce Water Act violations, such as ditching activities that increase the possibility of flooding on agricultural land.
   - Water conservation will become increasingly important, and government initiatives to increase public awareness of the importance of conservation and options for conserving water will be urgently required.
   - There will likely be a need for significant investment in infrastructure to effectively store and allocate future water supply .

2. *Ranking of future challenges*

The three issues identified as key priorities by our members are:

1. Industry and agriculture must find more efficient ways to use water resources. Fresh water should not be used for oil field injection purposes, and agricultural irrigation systems must be improved to utilize water more efficiently.
2. Contaminants originating from all sources must be carefully monitored and violations must be dealt with swiftly and firmly to ensure that water supplies are protected.
3. Responsible and equitable management and allocation of water resources will be critical to Alberta's continued prosperity, and will require: research initiated by the Government of Alberta (perhaps in partnership with the federal government) to develop adequate data on current water resources; and public education and awareness of the importance of water conservation and responsible use of water, and the options available to enhance water management and conservation efforts.

4. *Objectives for a future water strategy*

- The four fundamental objectives raised by the "ideas" group are consistent with the key themes raised by AAMD&C members at our Spring 2002 Issue Forum. However, our members would support adding a fifth objective, dealing with the need for proper balance in the allocation of water between urban, rural and industrial use.

6. *Private Water Systems*

- AAMD&C members support a cost-sharing arrangement between the provincial government and rural landowners to develop pipelines and regional water supply systems, pump water to dugouts, and monitor the quality of the water supply in private systems. AAMD&C members endorsed Resolution 17-99F, at the Fall 1999 Convention, urging the government of Alberta to partner with the Prairie Farm Rehabilitation Administration (PFRA) to provide assistance toward the construction or expansion of rural water supply systems. Our members recommend that this assistance be in the form of a cost-sharing program, with PFRA and the Alberta government supplying 75% of the funding, and affected landowners contributing 25% of the project cost.

8. *Small Municipal Water Systems*

- The Government of Alberta has a responsibility to ensure that Albertans have access to the highest standard of water quality realistically attainable. The provincial government must assist in funding the development of water supply systems, and should be responsible for monitoring water quality and providing technical support to municipal governments. Our members have expressed a willingness to share the costs of developing regional water supply systems, but the very limited financial resources available to most small communities means that the provincial (and perhaps federal) government will need to provide the majority of required funding.

9. *Public or Private investment in small municipal water systems*

- The provision of water service by public or private companies may be an acceptable arrangement in some cases, if two key conditions are satisfied:
    1. The local municipality must welcome the opportunity for another entity to provide water service to its residents, and;
    2. Ratepayers must not experience an increase in the cost of service.

10. *Water Supply and Allocation*

- AAMD&C members recognize an urgent need for studies to be conducted to determine the amount and location of groundwater in the province.
- There is no clear consensus within our membership on the "first in time/first in right" rule for groundwater licensing.
- AAMD&C members have expressed concern over December 31, 2001 deadline for registering traditional agricultural water use. Many individual water users may not have taken part in this process, and the data gathered through registration may be incorrect, due to public mistrust of the process. The AAMD&C would like to request the Minister's consideration of an extension of the registration process to December 31, 2002, along with a public education initiative clearly outlining the importance, and benefits to the individual, of the importance of registering water use.
- AAMD&C members have expressed support for metering the usage of water, and implementing a sliding scale for payment, as potentially effective tools for encouraging water conservation.
- Some AAMD&C members also support the concept of water storage, and damming water for future use.
- Inter-basin transfers are a source of great controversy among AAMD&C members. Some members support such transfers under certain conditions, while others are adamantly opposed to any interbasin transfers. There is a clear need for

MUNICIPAL DISTRICT OF ROCKY VIEW No. 44

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May 1, 2002

Equus Consulting
250, 9707-110 Street
Edmonton, AB
T5K 9Z9

Re: Response to 'Water for Life' workbook questionnaire survey:
Municipal District of Rocky View Position Paper

Dear Sirs,

Attached is a copy of a position paper that was prepared by the Municipal District of Rocky View Staff and Council. The paper was adopted by Council on April 30, 2002 as the official position of the Municipality regarding the recent 'Water for Life' seminars and workbooks that Alberta Environment has undertaken to assist in developing a provincial water strategy. Please note that the Municipality did consult with Anne McInerney of Alberta Environment to submit this paper and questionnaire response after the April 15, 2002 deadline.

Both Staff and Council felt that it was important for the Province to have a perspective, from the local land use decision makers and managers, as to what the local issues regarding water are and what we consider should be done to address these issues. The Municipality hopes that this paper and the collectively completed questionnaire aids the Province in their pursuit of a comprehensive water strategy that will assist in preserving water quality and quantity for existing and future generations.

The Municipality appreciates this opportunity to provide input on this matter. Should you have any questions regarding this paper and/or the questionnaire, please contact Neil Angus, Municipal Planner at (403)230-1401.

Sincerely,

Stan Schwartzenberger, ACP, MCIP
Director of Planning and Development

cc: Anne McInerney, Alberta Environment

WATER FOR LIFE: Alberta's water strategy

A Position Paper prepared by the Municipal District of Rocky View No.44 (as approved by Council on April 30, 2002)

1. INTRODUCTION

The purpose of this report is to provide the Province with the Municipal District of Rocky View's (MD) position with regard to water quality and quantity. The MD considers that it is important for the Province to have a perspective from the local land use decision makers and managers – as well as individual landowners and residents. The following paper presents a detailed response, from Municipal Staff and Council, to the questions and issues raised in the "Water for Life" workbook. This report is meant to identify the key issues associated with each section of the workbook and explain:

- The reasoning behind the MD's position;
- What action(s) by the various authorities need to occur to address these issues.

2. WHY A PROVINCIAL WATER STRATEGY IMPORTANT TO ROCKY VIEW

The MD surrounds the city of Calgary on three sides. Within its boundaries lie 14 Hamlets, 1 Village, 4 Towns, and the City of Airdrie. The MD 403,289 hectares (996,540 acres) of land. Over 2/3 of that land area drains to the Bow River with the remaining 1/3 draining to the Red Deer River. Over 94% of the land in the MD is zoned agriculturally. As a rural municipality, almost all landowners in the MD depend on available, clean and reliable surface and groundwater sources and hence water is of major importance to the MD. Further, the back to back drought conditions of the past few years have made many people take a step back and re-evaluate their current water usage – especially in rural areas where dependence on natural water sources is very high. As a result, water availability is becoming and increasingly important issue in the MD.

3. THE WATER FOR LIFE WORK BOOK

In keeping with the format the Province has chosen to follow, the MD Staff and Council have collectively discussed the issues identified in the Water for Life workbook. The following sections address the MD's viewpoint with regard to these issues:

PART A

What are the challenges regarding water?

There are concerns that with the current growth trends in the MD, water could potentially become an increasingly scarce resource in Alberta. Over allocation in some watersheds, combined with drought conditions, is placing a strain on the future of this resource and the economic prosperity associated with it. All of the "possible future challenges" listed in the workbook are issues that the Province is currently facing and are already becoming major challenges. At this stage it is important to take a step back and assess how all relevant authorities can deal with these challenges. The MD feels that the following points identify the major issues Alberta will face with regard to these challenges:

- Education. Knowledge about Alberta's water systems (their structure, function and interconnections) is critical to implementing a strategy that will be successful. Without knowing how these systems operate and what they require to function effectively (i.e., in-stream flow needs, importance of riparian zones and floodplains), we place a greater risk on the quantity and quality of water available. More funding and support needs to be dedicated to education initiatives by the Federal, Provincial and Municipal agencies. The relative short-term investment now would be invaluable in the long-term;

- Recognizing the direct link between land use and water quality. Effective management of water cannot be accomplished without effectively managing the land base and activities that occur on it. The challenge is how can we reflect the direct link in our everyday planning and land use decisions -- at all levels of government;
- Conservation. More efficient use of what we have is the key to sustainability of any finite renewable resource. The challenge is to effectively legislate more efficient use of water – so that it is not an option but a requirement – for the greater good of all Albertans. For example, the work book discusses investment in infrastructure as an effective water management tool (e.g., dams). Although investment in infrastructure is a solution, it is not a long-term strategy that addresses long-term drought conditions. Efficiency and reduction in usage (conservation) would be considered smart long-term strategies.

What objectives should guide a future water strategy?

The MD considers that all actions developed through this strategy should relate directly to the following objectives:

- Healthy, sustainable eco-systems;
- Safe drinking water;
- Sufficient supply for a sustainable economy;
- Public Education;
- Knowledge necessary to make effective water management decisions (managing supply and demand);
- Smarter approaches to land use planning and development.

The last point deals with a critical issue mentioned in the previous section – recognizing the link between land use and water quality and quantity. A shift in the current development trend must be encouraged in order to proactively approach water management. To date, most, if not all water strategies are a result of a reaction to a certain stress. Educating and informing the public on the linkages between water and land use will help promote acceptance and compliance with water management initiatives that are put forth by the government. Local, Provincial, Federal and Private partnerships would need to support such an initiative through increased cooperation, communication and funding for program development, implementation and follow-up.

The MD has recently been placing a much greater emphasis on water issues – both at the Staff level (in the review of land use and development applications as well as our involvement with regional water issues) and at the Council level (in the increased awareness of the impacts land use and development decisions place on water resources). By recognizing the importance of this resource, the MD will continue to place a strong emphasis on water issues and will continue to actively support and participate in local and provincial initiatives dealing with water – to ultimately achieve the objectives of the water strategy.

PART B

Achieving safe secure drinking water

Most rural areas depend on drinking water directly from the source, both surface and ground water. Rural areas such as the MD rely heavily on the cleansing functions of the natural systems (natural filtration and attenuation through riparian, floodplains, soils, surface and subsurface storage). Safe, secure drinking water can be provided by developing public and private treatment systems, but treatment is not the sole issue – why we have to treat the water should be just as important an issue. Many contaminants in water supplies are a direct or indirect result of human activities on the land. Understanding how our natural systems function therefore becomes increasingly important to protecting water quality.

The Province is the ultimate authority that issues permits for communal wells, surface withdrawals and discharges. As managers of water resources, it is the MD's position that the Province, in conjunction with Health Authorities and Municipal partnerships, should consider developing water quality standards and implement monitoring and enforcement programs to ensure the safety of public and private water supplies.

Reliable, quality water supplies for a sustainable economy

The correct balance between economic growth and a healthy environment is a major challenge for Alberta and the MD. One often occurs at the expense of the other. Striking a sustainable balance involves envisioning what we want our cities, towns, villages, communities and farms to look like in the future. Quality of life is an important aspect to residents of the MD. Economic prosperity is directly related to the health and well-being of the people who reside in these areas. It is essential to ensure that government is making well-informed and balanced decisions on economic growth and environmental sustainability.

To ensure reliable supplies of potable water are available to sustain the economy, the MD feels it is important to pursue the following initiatives:

- Identify In-stream flow requirements and how much water is available to allocate;
- Determine our limitations to growth (understand how natural systems function and evaluate the carrying capacity of our land and water – what is the maximum amount and type of development these resources can sustain – without materially damaging the critical functions of the natural environment;
- Allocate water based on its most valued use (in-stream flow priorities, re-evaluation of existing allocations);
- Place more money into education on water conservation initiatives (more efficient use of what we have).

Many of the suggested options in the work book involve immediate short-term solutions that do not address the root of the issue – respect for natural systems and more efficient use of what we have available. The MD supports the existing initiatives that the Province is currently undertaking to deal with some of these issues(South Saskatchewan River Basin Water Management Plan, participation in local and regional watershed initiatives such as the Nose Creek Watershed Partnership) and would encourage and support increasing Provincial staff and funding to provide additional assistance and ultimately improve implementation of the results of these initiatives. Increased provincial involvement would also aid in promoting better communication and coordination between different levels of government – which ultimately improves our services to the public.

Water conservation

The MD supports more efficient use of water resources by encouraging the following options:

- Educating Albertans about water conservation values and methods;
- Establishing water conservation incentives offered by government (e.g., tax rebates);
- Setting targets for water conservation on a watershed scale (promotes regional co-operation and basin-level planning)

There are numerous options currently available to conserve water consumption, from more efficient irrigation equipment for agricultural uses, to various lot-level BMP's in residential, industrial and commercial areas. These options need to be promoted as common practice in order to be accepted by the general public and developers. Adopting local and provincial policies to implement these conservation measures would ensure that BMP's are enforced. In addition, existing provincial and municipal policies must also be reviewed regularly to ensure they address water conservation, not discourage it (e.g., restrictions on usage of potable water in residential areas). The MD, with the support of Alberta Environment, would support the review, amendment and adoption of new policies that encourage water conservation (i.e, development of Provincial Water Management Plans that, in-turn give Municipalities guidance incorporating new local policies that require BMP's and water conservation).

Safeguarding Alberta's healthy ecosystems

Healthy aquatic ecosystems are an integral component of life. They serve unlimited benefits to the human and natural environment and thus should be recognized and protected for their important role. Again, understanding these systems and their interconnectedness with land, aquatic life, animals, plants and humans is so important for the general public and decision makers alike.

The MD would encourage the Province to pursue the following options to help ensure long-term sustainability of these aquatic ecosystems:

- Determine in-stream flow needs;
- Determining aquatic carrying capacities;
- Reducing point-source and non-point source pollution;
- Understanding inter-relationships and mandating protection of sensitive components within ecosystems to ensure long-term viability and prolonged health of the environment;

Polluted Stormwater runoff from human development is a major issue that is severely impacting the quality and quantity of water our waterways. Current acceptable stormwater and land management practices are placing major stresses on our aquatic systems – and the impacts are cumulative. Public education and awareness initiatives, followed up by mandated changes to current acceptable practices are needed.

4. CONCLUSION

All human growth places stresses on the environment – some known, some unknown. Regardless, all our activities influence water in one way or another. Understanding the current state of our water resources and evaluating their carrying capacities is an important part of identifying our provincial and regional growth limitations. There is no quick and easy solution to water management. It is a very complex issue to deal with since there are so many variables that influence this invaluable resource. Public education and awareness initiatives are the key to successful implementation of any strategy. Clear direction and co-operation between Provincial and Municipal governments is also essential to manage this resource most effectively.

The economics of supply and demand must be assessed carefully and the costs vs. the benefits must be carefully weighed and evaluated. Demand has not yet exceeded supply but it is becoming increasingly close year after year. We need to recognize the link between land use and water quality to be able to promote smarter, more efficient use of the water resources we have now and be able to adapt to the ever changing environment. Albertans need to rely on those who manage the resource to make the right decisions now and for the future. The MD of Rocky View supports this Provincial imitative and would encourage the Province to continue working towards developing, implementing and enforcing land and resource management strategies and initiatives that will educate all Albertans and promote more efficient use and secure our water resources for the future.

With over 94% of land in Agricultural production, water continues to be a critical resource to MD residents and their livelihood and well-being. This position paper raises a number of issues and concerns with respect to water resources in Alberta and recommends actions that the MD would encourage the province to consider when developing a water strategy for Alberta. The MD appreciates this opportunity to comment to the Province and hopes this paper aids in the development of a more comprehensive water strategy to ensure the future protection of water resources in Alberta.

MUNICIPAL DISTRICT OF ROCKY VIEW COLLECTIVE RESPONSE

part ⓐ

what are the challenges?

Since the water strategy will address the future of Alberta's water management, some assumptions must be made about the challenges we will face in the future. Late last year, a small, diverse "ideas" group of Albertans provided the Government of Alberta their advice on water management in the province. Their input, combined with some additional research, has led to the list of challenges in the table below.

1. Review the following list of challenges. For each challenge, indicate whether you agree or disagree with the statement.

Possible Future Challenges	Agree	Disagree	Unsure
a. Water will become an increasingly scarce resource in Alberta	☑	☐	☐
b. Access to safe drinking water will become a significant issue for Albertans	☑	☐	☐
c. Water availability will limit growth in Alberta	☑	☐	☐
d. Climate change will seriously affect water flows in Alberta	☑	☐	☐
e. Industrial and agricultural growth will create greater demands for water – not always in places where water is plentiful	☑	☐	☐
f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth	☑	☐	☑
g. Surface water and groundwater will be vulnerable to pollution and contamination	☑	☐	☐
h. Flooding will pose a threat to human safety and create potential damage and economic costs	☑	☐	☐
i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important	☑	☐	☐
j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure	☑	☐	☐

2. Of these challenges, please indicate the three most important for the Government of Alberta to address: ☑ a. ☐ b. ☐ c. ☐ d. ☐ e. ☐ f. ☑ g. ☐ h. ☑ i ☐ j

3. Are there any additional challenges that should be considered?

① AGRICULTURAL POLLUTION OF WATER RESOURCES

② WATER AVAILABILITY FOR FIRE PROTECTION IN RURAL MUNICIPALITIES.

what objectives should guide a future water strategy?

The "Ideas" group identified four fundamental objectives for the water strategy. They are to ensure Alberta has:

- Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater)
- A safe, secure drinking water supply
- Reliable, quality water supplies for a sustainable economy
- The knowledge necessary to make effective water management decisions

Alberta's water strategy will assist the Government of Alberta to make wise water management decisions, now and in the future.

4. Do you agree these objectives should guide Alberta's water strategy? ☑ Yes ☐ Not Sure ☐ No

If no, what would you change or add?

____

____

part ⓑ

achieving safe secure drinking water

Private Water Systems

Private water systems are typically found in rural areas. Because of the distance between households, it is generally too expensive for these property owners to connect to a municipal drinking water system. Therefore, approximately 600,000 Albertans get their drinking water from a source other than an approved water treatment facility. They get their water by drilling into the ground, using a lake or river, or by hauling water in by truck and storing it in large holding tanks. Sometimes a group of rural residents will establish a water co-operative that provides untreated water to its members.

5. Do you get your water from your own private system? ☑ Yes ☐ No

6. Because private systems fall outside Alberta Environment's approval process, the safety of private water supplies can not be guaranteed. Currently, the property owner is responsible for ensuring his or her own water quality and quantity.

Considering this, please review the options in the table below. For each option, indicate:

1=Property owner's responsibility, 2=Shared responsibility between the property owner and the provincial government, 3=Provincial government's responsibility.

Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Private Water Systems	**Implications to Consider**	**Whose Responsibility?**
Monitor the quality and safety of the water supply for private water systems	A single water sample costs between $50 and $150 to analyze, depending on the type of analysis	1 [✓ 2] 3
Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences	A recent project is estimated to cost $32 million to supply 500 rural families with water. Developing regional water supply systems is not feasible everywhere	1 [✓ 2] 3
Develop individual water supplies (e.g. well drilling, dugout construction, water hauling)	A well costs $5,000 to $15,000. A dugout costs $3,000 to $5,000. Hauling water costs $800 to $2,000 annually	[✓ 1] 2 3
Pump water from distant sources to dugouts during times of drought	Pumping costs vary greatly depending on the distance from the new water source. Assumes that another source is available within a reasonable distance	1 [✓ 2] 3
Add your own example... IDENTIFY AND IMPLEMENT ALTERNATIVES TO REDUCE THE DEPENDENCE OF COUNTRY RESIDENTIAL DEVELOPMENTS (IN RURAL MUNICIPALITIES) ON GROUNDWATER SOURCES.		1 [✓ 2] 3
Add your own example...		1 2 3

Small Municipal Systems

Towns, villages, hamlets and municipal developments often find it difficult to pay for the construction and operation of water facilities. They also find it difficult to train and keep staff to operate these facilities.

7. Do you get your water from a small municipal system? ☐ Yes ☐ No N/A

8. Alberta Environment currently sets and enforces drinking water standards for every Alberta municipality, reviews the water quality reports prepared by each municipality, and certifies the facility operators. Small municipal systems, however, are still more vulnerable to possible contamination as they are less able to invest in new technologies and overall improvements to their water treatment facilities.

   Considering this, please review the options in the table below. For each option, indicate whether it should be implemented, and if so, by whom: **1=Municipality's responsibility, 2=Shared responsibility between the municipality and the provincial government, 3=Provincial government's responsibility.**

   Please add any additional options in the space provided.

Options for Ensuring the Quality, Safety and Quantity of Small Municipal Systems	Implications to Consider	Whose Responsibility?
Supply technical advice to small municipalities about facility operations, maintenance and monitoring	These services could be purchased from private firms or provided as a service of the provincial government	1 2 [✓ 3]
Monitor the quality and safety of water at small water treatment plants	This monitoring could be done by the municipality, consultants or provided as a service of the provincial government	1 [✓ 2] 3
Develop regional water supply systems	Provides consistent, high-quality drinking water (e.g. water from the City of Edmonton is currently provided to approximately 40 other communities as far away as Vegreville)	1 2 [✓ 3]
Add your own example...		1 2 3
Add your own example...		1 2 3

9. Do you think companies (public or private) should be allowed to invest in water systems and provide drinking water to small municipalities? ☑ Yes ☐ No

reliable, quality water supplies for a sustainable economy

The availability of water is a real constraint to the type, amount and location of economic growth in the province. Without sufficient water, Alberta may see significant constraints in the expansion of agriculture in the south, oil sands in the north, and petrochemical development in central Alberta. The water strategy must address the issue of water availability for continued economic growth in Alberta.

This section focuses on Alberta's economy, and striking the right balance between a sustainable economy, a healthy environment and the social well-being of Albertans.

How water is allocated in Alberta

Agricultural, industrial and municipal water users apply to Alberta Environment for a license to use a set allocation of water. Wherever possible, water is managed to provide for these users. In times of shortage, however, the most recently issued license holders are asked to shut down so that more senior license holders can be assured their allocation under the current priority system. This system is known as *first in time, first in right*. The older the license the higher its priority, regardless of how the water is being used.

Before water can be allocated to new users, Alberta Environment must consider three things:

a) *Aquatic environment*
   The amount of water necessary to safeguard and maintain aquatic ecosystems must be determined and preserved.

b) *Apportionment agreements*
   Alberta has made commitments to the province of Saskatchewan and the state of Montana over the amount of water that will flow into each respective jurisdiction.

c) *Existing water licenses*
   New water allocations must not impact existing licenses.

The first step in deciding how much water can be allocated is to determine the amount necessary for the aquatic environment, for apportionment agreements, and for existing water license holders. This amount is subtracted from the total amount available, the remainder can then be used for supporting the economy and for human use. Depending on weather conditions, that amount is different each year.

Under current practices, once the total amount of water available for human use and economic development has been allocated, a moratorium is placed on the river basin or groundwater aquifer and no further water is allocated. Certain basins in southern Alberta are nearing the limits of water allocation – particularly during dry periods when less water is flowing in the rivers.

In the South Saskatchewan River Basin, there is little opportunity remaining for any major operation to obtain a license to withdraw water from the basin. There is a possibility this trend will continue. Depending on unpredictable variables such as future weather patterns, we may begin to see other river basins reaching their limits of available water in the next 25 years.

10. Please review the following list of options. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional opinions in the space provided.

Options *(How could we respond if river basins become fully allocated?)*	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine groundwater availability throughout the province	Currently the provincial government does not have detailed information on the amount of groundwater available at all locations in the province	1	2	3	4	[✓ 5]
Allocate all available water by "first in time/first in right" rule, then prohibit any further allocation of water in the basin	Newer (junior) license holders are at risk during dry periods. No allowance for future population or economic growth. Potential pressure on aquatic ecosystems	1	2	3	[✓ 4]	5
Allocate water based on its most beneficial, or valued, uses	There are many views on which water uses have the most "value"	1	2	3	[✓ 4]	5
Allocate water to further uses even if this potentially harms aquatic environments	Aquatic habitats and species may be adversely affected to achieve further economic development	[✓ 1]	2	3	4	5
Set aside water for future population growth before there are any shortages	Current generations will have to live with limitations on water availability to allow for future population growth	1	2	3	[✓ 4]	5
Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)	Has been used in Alberta and elsewhere to solve water shortages	1	2	3	[✓ 4]	5
Encourage more efficient use of water through pricing to reduce overall use	Users who can create the greatest value from their water allocation will provide more economic benefits	1	2	3	4	[✓ 5]

		Disagree Agree
Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations	Reservoirs are often expensive to construct and they flood lands. Reservoir water can stimulate economic growth and reservoirs and their outflows can support aquatic habitats	1 2 3 [✓ 4] 5
Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)	Little information exists on the costs. Such a system has been proposed for many years to supply water from the North Saskatchewan River to the heavy oil industry in the Cold Lake Region	[✓ 1] 2 3 4 5
Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)	There may be ecological consequences. Little information exists on the costs	[✓ 1] 2 3 4 5
Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods	Does not address the risk of all water users. Individuals who have not stored water will continue to be at risk during low flows	1 2 3 [✓ 4] 5
Add your own example...		1 2 3 4 5
Add your own example...		1 2 3 4 5

water conservation

Water conservation refers to the planned protection, improvement, and wise use of water resources. It also includes controlling, protecting, and managing water. Water conservation may also mean improving the efficiency of industrial and agricultural water use. By generating the most efficient use of water, its overall productivity is enhanced and more water is made available for new operations. Increased water efficiency and water conservation plans also reduce the need for high cost expansions of water treatment and distribution systems.

11. Please review the following list of options for conserving Alberta's water. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

Please add any additional options in the space provided.

Options for Conserving Water	**Considerations, Possible Implications**	**Disagree**				**Agree**
Establish a price for water used by industrial and agricultural operations	Putting a price on any product encourages people to use the product wisely. At present, there is no charge to the operators for withdrawing water from a river, lake or groundwater	[✓ 1]	2	3	4	5
Establish a price for water used by individual households	Municipalities currently charge a fee for treating and distributing domestic water. At present, there is no charge to the municipality, or its residents, for withdrawing water from a river, lake or groundwater source	[✓ 1]	2	3	4	5
Educate Albertans about water conservation values and methods	Purpose would be to create a water ethic shared by all water users	1	2	3	4	[✓ 5]
Establish water conservation incentives (e.g. tax rebates) offered by government	May come at a cost to taxpayers	1	2	3	4	[✓ 5]
Set targets for water conservation for various sectors using best management practices	Targets would provide guidance for better water use within sectors but may be difficult to set across the province and between sectors	1	2	3	4	[✓ 5]
Add your own example...		1	2	3	4	5
Add your own example...		1	2	3	4	5

safeguarding alberta's healthy ecosystems

Healthy aquatic ecosystems are integral to Alberta's water resources. As the province's economy and population grows, aquatic ecosystems are affected as we allocate water from natural sources to human uses. Aquatic ecosystems are also affected by changes in water quality that result from human use. The Government of Alberta adopts international quality standards and monitors some portions of aquatic systems to ensure they are not being damaged by human use.

12. Considering our water resources will be facing increased pressures in the coming years, please review the following options the Government of Alberta could consider to prevent, or respond to, unacceptable aquatic ecosystem changes. Indicate the extent to which you agree or disagree with each option by circling the appropriate number: **1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree.**

    Please add any additional options in the space provided.

Options for Protecting Aquatic Ecosystems	**Considerations, Possible Implications**	**Disagree**				**Agree**
Determine how much water the aquatic environment requires to remain healthy	Without this information it is difficult to allocate water without putting the aquatic environment at risk. It is difficult to accurately quantify and protect "natural demand"	1	2	3	4	[✓ 5]
Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin	This is generally done within a water management plan that balances the values of society. These values may change over time	1	2	3	4	[✓ 5]
Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm	Both point (pipe discharge) and non-point (runoff from land) sources of substances need to be identified and monitored. Non-point sources are difficult to measure	1	2	3	4	[✓ 5]
Identify sensitive aquatic environments or habitats that require additional protection	Without this information it is difficult to make management decisions putting the aquatic environment at risk	1	2	3	4	[✓ 5]
Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management	The activities that occur in a watershed, along with our decisions on land use, can affect aquatic systems	1	2	3	4	[✓ 5]

		Disagree			Agree	
Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use	Economic development opportunities may be lost to achieve environmental protection	1	2	3	4	[✓ 5]
Add your own example...		1	2	3	4	5
Add your own example...		1	2	3	4	5

additional comments

Please feel free to submit any additional thoughts or ideas you may have.

respondent information

The final questions are for our statistical calculations only.

1. Where do you live? *(please check one and provide name)*

○ City

○ Town

○ Village, Hamlet

Rural Resident (provide name of nearest community)

○ Metis Settlement

○ Indian Reserve

☒ Other MUNICIPAL DISTRICT OF ROCKY VIEW (INCLUDES NUMEROUS VILLAGES AND HAMLETS)

2. What is your postal code? T2E 6X6 (MUNICIPAL OFFICE)

3. Are you answering this questionnaire as...

○ A private citizen

○ A group or organization (please name the group)

☒ A local government (please name the community) MUNICIPAL DISTRICT OF ROCKY VIEW

○ A private company (please name the company)

○ Other

If you have answered this work book on behalf of a group, local government or company, please feel free to complete an additional work book as a private citizen.

4. If you would like to be added to Alberta Environment's mailing list, please submit your name and address. (optional)

Please return work book in the envelope provided by **April 15, 2002**. Work book is also available on-line at *www.waterforlife.gov.ab.ca*.

30. Northern Alberta Development Council

Alberta
NORTHERN ALBERTA
DEVELOPMENT COUNCIL

Memorandum

Postal Bag 900-14
Peace River

Fwd To
Dept.

FROM: **Gary Friedel,** Chair
Northern Alberta Development Council
M.L.A. for Peace River
612 Legislature Annex

Date: May 6, 2002

Telephone: 422-5374
Fax: 422-6284

RECEIVED
Client Relations Unit
Alberta Environment
MAY [illegible] - 2002
5950

Lorne

TO: **Honourable Lorne Taylor**
Minister of Environment
423 Legislature Building

RE: Water Strategy for Alberta – A Northern Perspective

Attached is the response from the Northern Alberta Development Council, to your request for feedback on Water for Life.

Please accept our thanks for agreeing to the extended time to submit the report, so that we could properly take it through our regular meeting process last Friday.

If you have any questions regarding our report and recommendations, call me anytime.

Gary

Gary Friedel

Printed on recycled paper

Water Strategy for Alberta

The Challenges, Objectives and Guiding Principles: A Northern Perspective

Alberta

NORTHERN ALBERTA
DEVELOPMENT COUNCIL

May 2002

Northen Alberta Development Council

Water Strategy for Alberta
The Challenges, Objectives and Guiding Principles:
A Northern Perspective

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- Effective Water Management 12
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- Water Safety and Pollution 14

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Recommendations 17

Appendix

Introduction

The Northern Alberta Development Council (NADC) has had a long-standing interest in water issues. Sound environmental management has a fundamental role in sustainable development. Northern Albertans face a number of opportunities and challenges regarding water management. They have raised issues relating to: safe drinking water, water supply, drought, flood, erosion, pollution, municipal treatment and distribution infrastructure, and access to water management information.

This paper reviews the challenges of water management, objectives for a water strategy, outlines guiding principles for water management and provides a number of recommendations. The NADC has been involved in past and current research projects on water management. Key leader presentations and discussions at major conferences contributed to developing the NADC position on water management.

Assumptions About Future Challenges

Water management is complex, subject to many variables and the uncertainty of weather. The Provincial Government asked Albertans, in the current review of water management, to comment on a series of assumptions of future challenges of water management. Following is a review of several key concerns of the NADC about some of the assumptions that have been under discussion at community workshops and in the media. The paper focuses on assumptions regarding:

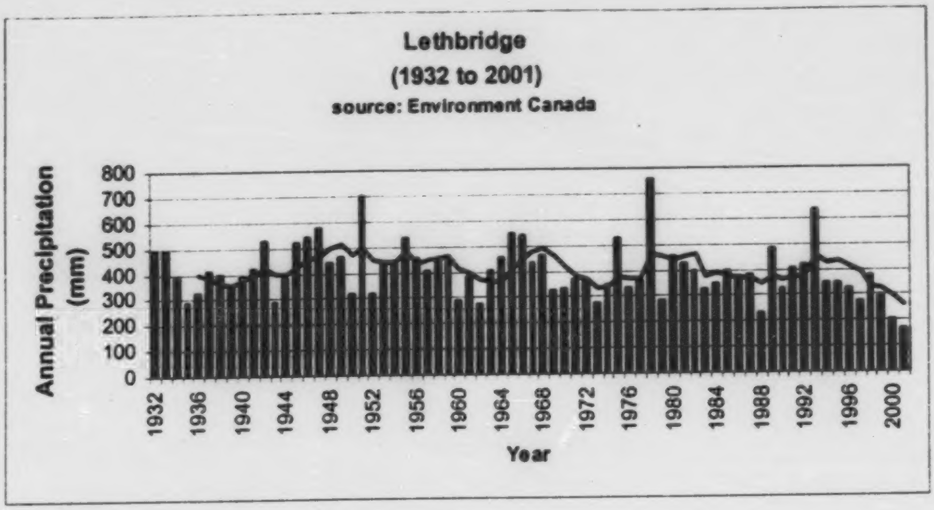
- The Scarcity of Water and its Impact on Alberta's Communities and Industry;
- Effective Water Management;
- Economic Development and the Environment; and
- Water Safety and Pollution.

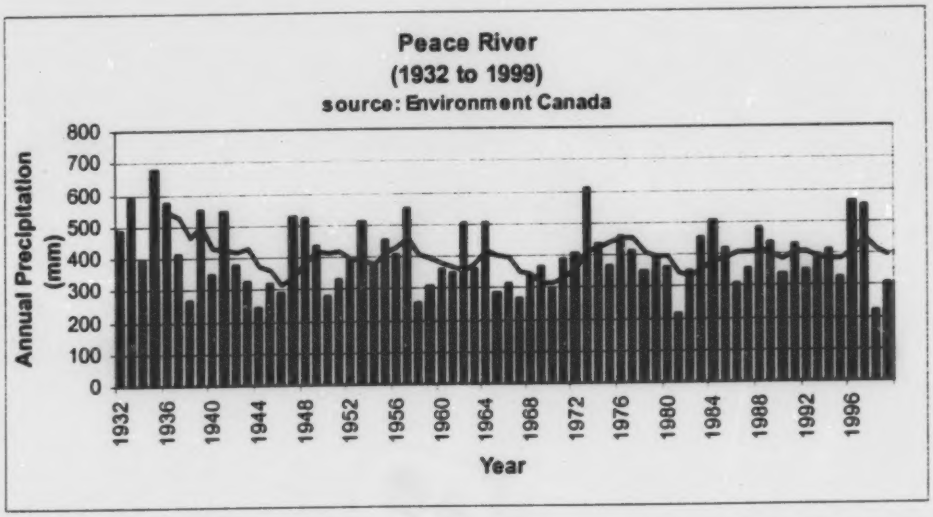
The Scarcity of Water and its Impact on Alberta's Communities and Industry

The issue of scarcity of water is at the heart of much of the current debate on water management. Several observations can be made:

- There is no clear unequivocal answer that can be given regarding whether or not water is actually becoming scarce in comparison to long term trends. Some areas have suffered or are suffering from drought. However, this does not mean that there is a water shortage for all Albertans, in all communities, at all times. Northern and other communities have experienced floods from high snow falls; heavy rains; rapid melt and runoff; and ice jams followed by periods of drought. Clearly, some communities and industrial sectors are currently experiencing shortages of water compared to what they have become accustomed to.

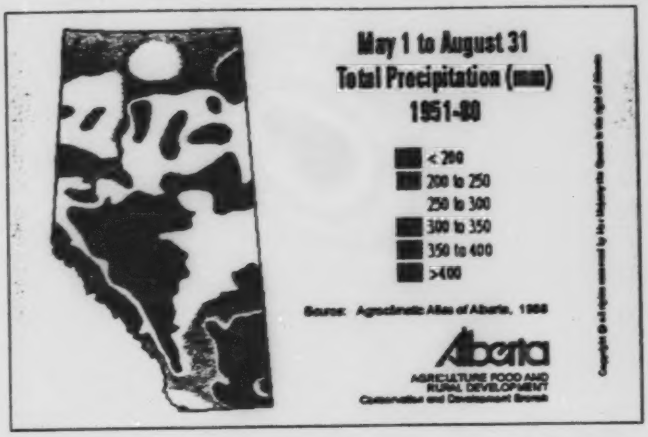
- Southern Albertans are often surprised that northern Albertans are also concerned about water quantity. The following two graphs illustrate the long-term precipitation rates for Lethbridge and Peace River. The black line represents the five year moving average



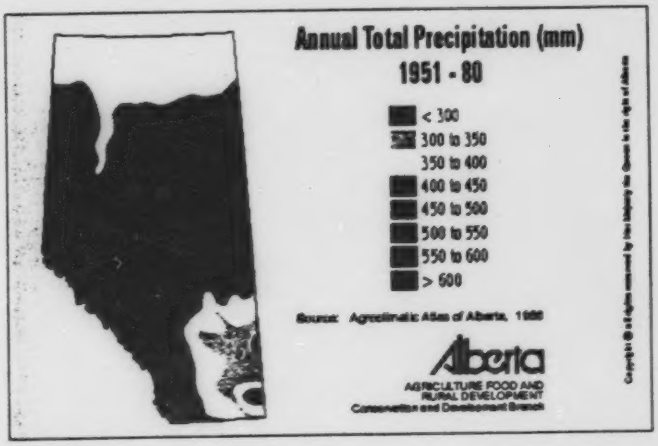


The average annual precipitation for Peace River is 400.7 mm and 402 mm for Lethbridge. In most years, both communities were under their average annual precipitation. Historically, a sharp drop in precipitation is often followed by above average precipitation.

The following map illustrates that the average precipitation for May 1 to August 31 in the Lethbridge Region is equal to that of the agricultural areas in the Peace Region. The difference between the two regions is that the rate of evapo-transpiration is less in northern Alberta.

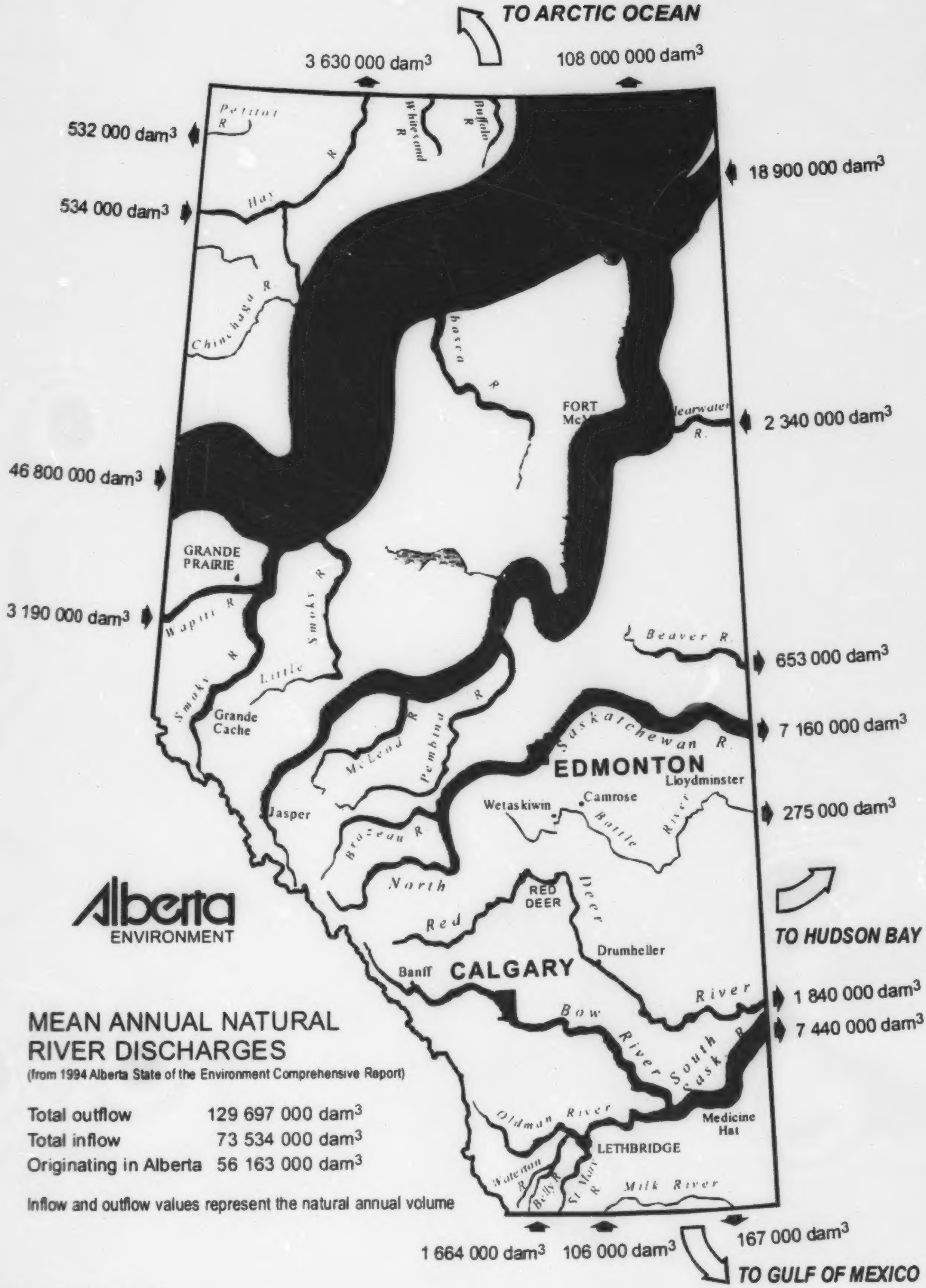

May 1 to August 31
Total Precipitation (mm)
1951-80
< 200
200 to 250
250 to 300
300 to 350
350 to 400
>400
Source: Agroclimatic Atlas of Alberta, 1986
Alberta
AGRICULTURE FOOD AND RURAL DEVELOPMENT
Conservation and Development Branch

The following map shows that the average annual precipitation is higher in the north than the south. However, a considerable portion of the north does not have groundwater sources and is therefore dependant on surface water from dugouts, rivers and some lakes.


Annual Total Precipitation (mm)
1951 - 80
< 300
300 to 350
350 to 400
400 to 450
450 to 500
500 to 550
550 to 600
> 600
Source: Agroclimatic Atlas of Alberta, 1986
Alberta
AGRICULTURE FOOD AND RURAL DEVELOPMENT
Conservation and Development Branch

- Water for Life: Facts and Information on Water in Alberta 2002, page 9, refers to the many northern lakes. However, the number of lakes in Alberta are minuscule compared to the 94,000 lakes in Saskatchewan (mostly located in the northern portion of the province.) Furthermore, the quality of many of the northern lakes in Alberta is poor.

- The media and others tend to focus on images such as the following map, Mean Annual River Discharges depicting the massive water discharge of the Peace and Athabasca Rivers compared to the southern rivers. It should be noted that:
  - ✓ Forty-six percent of the discharge of the Peace and Athabasca Rivers is made up of water originating in British Columbia.
  - ✓ The Inter-Provincial Apportionment Agreements state that Alberta must pass on downstream, 50% of its water, based on long-term averages.


TO ARCTIC OCEAN
3 630 000 dam3
108 000 000 dam3
532 000 dam3
534 000 dam3
18 900 000 dam3
46 800 000 dam3
3 190 000 dam3
2 340 000 dam3
653 000 dam3
7 160 000 dam3
275 000 dam3
TO HUDSON BAY
1 840 000 dam3
7 440 000 dam3
1 664 000 dam3
106 000 dam3
167 000 dam3
TO GULF OF MEXICO
Petitot R
Whitesand R
Buffalo R
Hay R
Chinchaga R
Athabasca R
FORT McMurray
Clearwater R.
GRANDE PRAIRIE
Wapiti R
Smoky R
Little Smoky R
Grande Cache
Beaver R.
Saskatchewan R.
McLeod R
Pembina R
EDMONTON
Lloydminster
Jasper
Wetaskiwin
Camrose
Battle River
Brazeau R
North
Red Deer
RED DEER
Drumheller
Banff
CALGARY
River
Bow River
South Sask. R
Oldman River
Medicine Hat
LETHBRIDGE
Waterton R
Belly R
St Mary R
Milk River

Alberta
ENVIRONMENT

MEAN ANNUAL NATURAL RIVER DISCHARGES

(from 1994 Alberta State of the Environment Comprehensive Report)

Total outflow	129 697 000 dam^3
Total inflow	73 534 000 dam^3
Originating in Alberta	56 163 000 dam^3

Inflow and outflow values represent the natural annual volume

M-DISCH-NAT-1.CDR/gurnem9mar2001

Data indicates that the volumes of water in the Peace, Athabasca, and North Saskatchewan Rivers are relatively stable compared to the Beaver, South Saskatchewan, Oldman and Milk River which have larger swings in volume Although the overall average outflow from Alberta for the Peace and Athabasca is consistent, these regions drain a huge area. The Annual Total Precipitation map showed that regions within these northern river basins have large average differences in precipitation. Furthermore, the precipitation for a local area can vary widely from year to year and from its neighbouring communities.

The consistency of overall stability of the northern rivers is a strength for northern Alberta, as it permits further development, whereas as the uncertainty of average river basin flows in southern Alberta raises questions concerning the viability of current usage.

- Water for Life: Facts and Information on Water in Alberta 2002, states that surface water is the source for 97.5% of the consumptive uses of water in Alberta. The main users of surface water are irrigation (71%), commercial/industrial operations (15%), and municipalities (5%). The thirteen southern irrigation districts account for 84% of Alberta's irrigated land. Irrigation enables 4% of Alberta's cultivated land base to produce 16% of its total crop production according to a study prepared by the Alberta Irrigation Projects Association.[1]

However, irrigation is a heavy user of water. The following Alberta Environment map, Surface Consumptive Allocation, shows the consumption patterns for Alberta's major river basins. The Surface Consumptive Allocation map shows that 91% of the allocated surface water in the Bow River Basin is allocated to irrigation and 5% is allocated to municipalities. Irrigation in the Oldman River Basin is allocated 90% of the water and municipalities are allocated 4%.

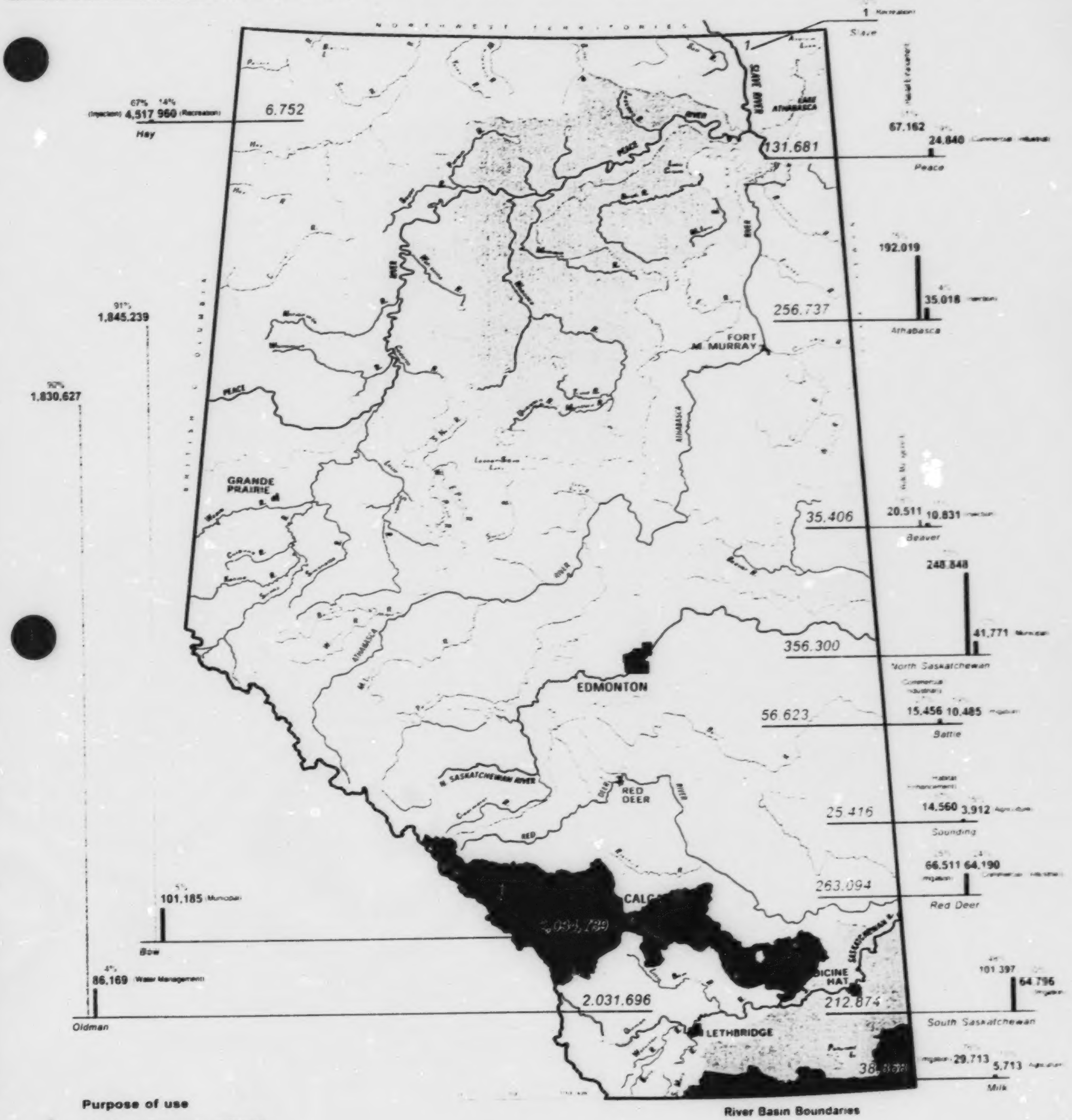
As many of the current concerns about water shortage originated in southern Alberta, discussion needs to focus on current consumption, particularly on irrigation practices in this region. Before the southern region looks for relief from the Province or water diversion from other regions, it needs to consider:

✓ Whether irrigation is the best use of its water resources;
✓ Which irrigated crops provide the greatest return relative to water costs; and
✓ How to encourage best use practices in irrigation.

While irrigation systems in Southern Alberta might support crops that cannot be easily or economically grown in other regions in Alberta, it is questionable whether it is wise to use or expand this expensive infrastructure for the purpose of growing common crops such as Alfalfa or Canola, which are basically being subsidised by the taxpayer through irrigation infrastructure, when these crops can be readily produced in other regions without similar support.

---

[1] Alberta Agriculture, Food and Rural Development, Sustainable Irrigated Agriculture in Alberta, Website.


NORTHWEST TERRITORIES
BRITISH COLUMBIA
1 Recreation
Slave
67% 14%
(Injection) 4,517 960 (Recreation)
6.752
Hay
131.681
67.162
24.840 Commercial Industrial
Peace
192.019
35.018 Injection
256.737
Athabasca
35.406
20.511 10.831 Injection
Beaver
248.848
41.771 Municipal
356.300
North Saskatchewan
Commercial Industrial
15.456 10.485 Irrigation
56.623
Battle
Habitat Enhancement
14.560 3.912 Agriculture
25.416
Sounding
66.511 64.190
Irrigation
Commercial Industrial
263.094
Red Deer
101.397 64.796
Irrigation
212.874
South Saskatchewan
Irrigation 29.713 5.713 Agriculture
Milk
91%
1,845.239
5%
101.185 Municipal
Bow
92%
1,830.627
4%
86.169 (Water Management)
2.031.696
Oldman
SLAVE RIVER
LAKE ATHABASCA
PEACE RIVER
ATHABASCA
FORT McMURRAY
GRANDE PRAIRIE
EDMONTON
N. SASKATCHEWAN RIVER
RED DEER
RED DEER RIVER
CALGARY
MEDICINE HAT
SASKATCHEWAN
LETHBRIDGE

Purpose of use

- Injection (oil recovery methods)
- Agricultural
- Commercial/Industrial
- Habitat Enhancement (wetlands)
- Irrigation
- Municipal
- Recreation
- Water Management (lake levels)

1,817.167	Total Annual Allocation per Basin (in dam³)
77.376	Allocated Surface water usage (in dam³)
%	Percentage of allocated Surface water usage

Bar graph shows 2 Major usages within the Basin

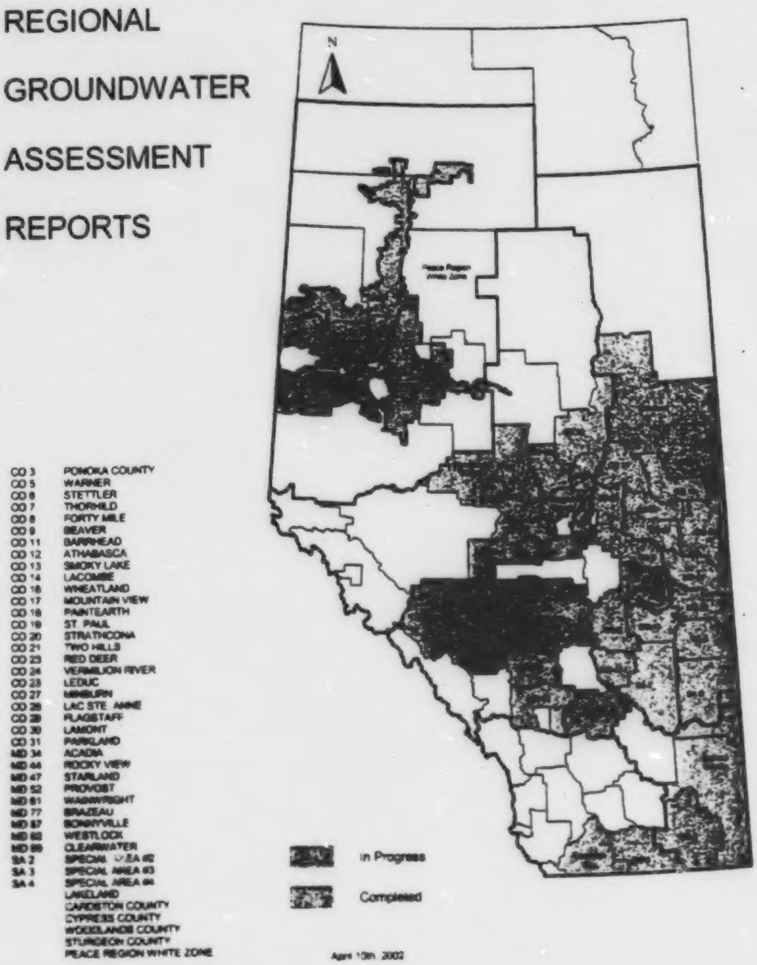
River Basin Boundaries

- Hay River Basin
- Slave River Basin
- Peace River Basin
- Athabasca River Basin
- Beaver River Basin
- North Saskatchewan River Basin
- Battle River Basin
- Red Deer River Basin
- Sounding Creek River Basin
- Bow River Basin
- Oldman River Basin
- South Saskatchewan River Basin
- Milk River Basin

Alberta

Surface Consumptive Allocation

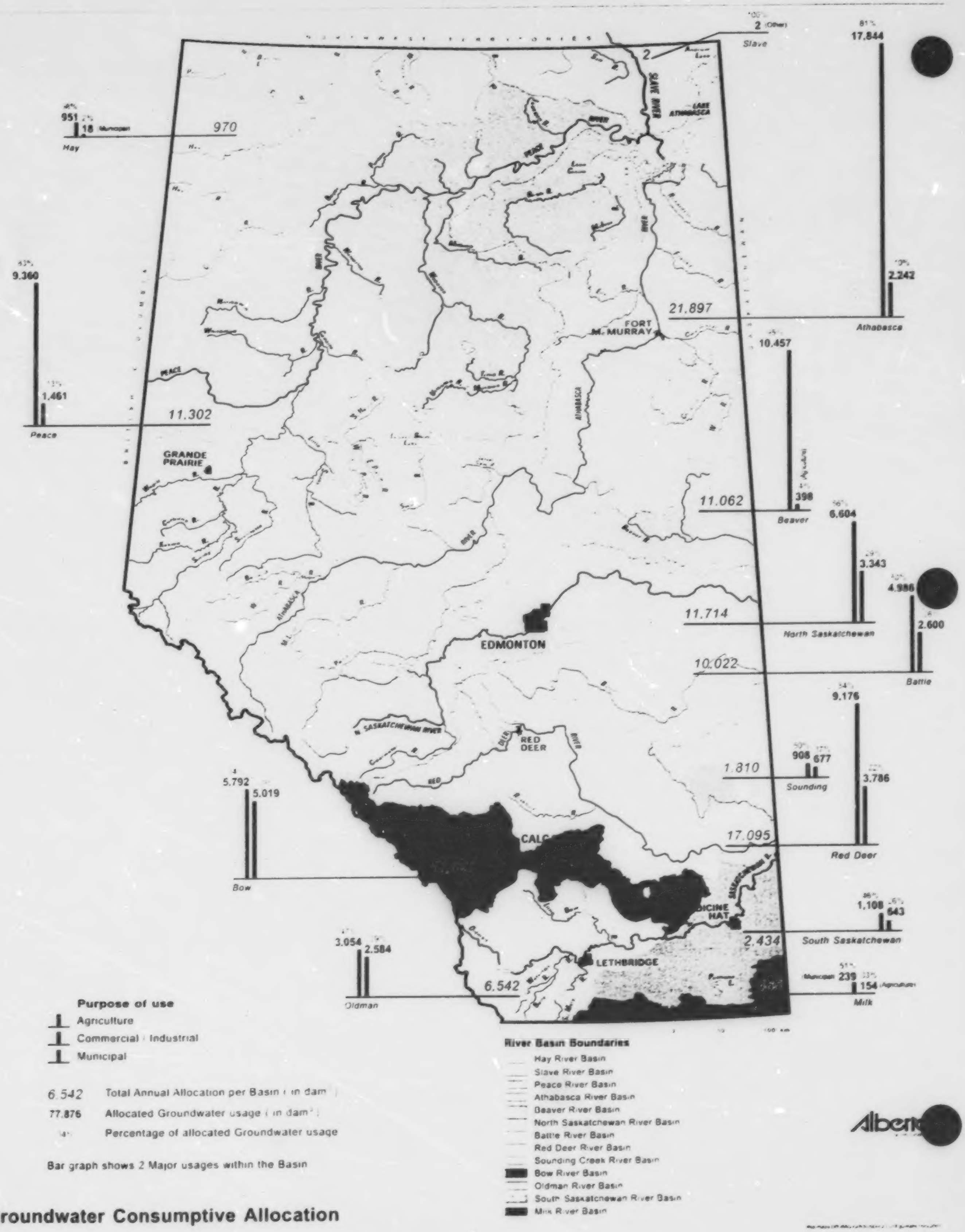
- Although surface water has a more significant role in Alberta than groundwater (2.5%), groundwater for consumption is still critical in some regions and for some users. Groundwater mapping has been largely completed for most southern areas of the province. The map below illustrates the large amount of work left to do in identifying groundwater sources in the north. Much of the mapped area in the north does not have access to quality groundwater. Funding is required to map and monitor priority area in the green zone adjacent to farms and towns.


REGIONAL
GROUNDWATER
ASSESSMENT
REPORTS
N
Peace Region White Zone
CO 3 PONOKA COUNTY
CO 5 WARNER
CO 6 STETTLER
CO 7 THORHILD
CO 8 FORTY MILE
CO 9 BEAVER
CO 11 BARRHEAD
CO 12 ATHABASCA
CO 13 SMOKY LAKE
CO 14 LACOMBE
CO 16 WHEATLAND
CO 17 MOUNTAIN VIEW
CO 18 PAINTEARTH
CO 19 ST. PAUL
CO 20 STRATHCONA
CO 21 TWO HILLS
CO 23 RED DEER
CO 24 VERMILION RIVER
CO 25 LEDUC
CO 27 MINBURN
CO 28 LAC STE. ANNE
CO 29 FLAGSTAFF
CO 30 LAMONT
CO 31 PARKLAND
MD 34 ACADIA
MD 44 ROCKY VIEW
MD 47 STARLAND
MD 52 PROVOST
MD 61 WAINWRIGHT
MD 77 BRAZEAU
MD 87 BONNYVILLE
MD 92 WESTLOCK
MD 99 CLEARWATER
SA 2 SPECIAL AREA #2
SA 3 SPECIAL AREA #3
SA 4 SPECIAL AREA #4
LAKELAND
CARDSTON COUNTY
CYPRESS COUNTY
WOODLANDS COUNTY
STURGEON COUNTY
PEACE REGION WHITE ZONE
In Progress
Completed
April 10th, 2002

Source: Prairie Farm Rehabilitation Administration

Alberta Environment has a Groundwater Observation Well Network consisting of 186 wells throughout the populated areas of the Province. There is a wide variation in the stability of this water source. It is difficult to detect an overall trend for the Province. Some well sites show a marked and consistent decline in water while other well sites show a gradual increase in water. Studies may have to be done to determine the cause of changes in these water levels. Further detailed information on the location of test well sites, and a selection of trends of water levels at several sites are included in the Appendix.

The following map Groundwater Consumptive Allocation shows the percentage of allocated groundwater used by different sectors. Commercial and industrial users are the main users of groundwater in the Peace, Athabasca and Beaver River Basins. Agriculture users are more predominant in the southern river basins.


NORTHWEST TERRITORIES
100%
2 (Other)
Slave
2
SLAVE RIVER
LAKE ATHABASCA
81%
17.844
10%
2.242
21.897
Athabasca
951
2%
18 Municipal
970
Hay
PEACE RIVER
FORT McMURRAY
ATHABASCA
9.360
13%
1.461
11.302
Peace
GRANDE PRAIRIE
10.457
4%
398
11.062
Beaver
56%
6.604
29%
3.343
11.714
North Saskatchewan
EDMONTON
4.986
2.600
10.022
Battle
N. SASKATCHEWAN RIVER
RED DEER
54%
9.176
22%
3.786
908
677
1.810
Sounding
17.095
Red Deer
5.792
5.019
Bow
CALGARY
MEDICINE HAT
SASKATCHEWAN R.
1,108
643
2.434
South Saskatchewan
3.054
2.584
LETHBRIDGE
6.542
Oldman
51%
Municipal 239
33%
154 (Agriculture)
Milk
100 km
Purpose of use
Agriculture
Commercial / Industrial
Municipal
6.542 Total Annual Allocation per Basin (in dam³)
77.876 Allocated Groundwater usage (in dam³)
Percentage of allocated Groundwater usage
Bar graph shows 2 Major usages within the Basin
River Basin Boundaries
Hay River Basin
Slave River Basin
Peace River Basin
Athabasca River Basin
Beaver River Basin
North Saskatchewan River Basin
Battle River Basin
Red Deer River Basin
Sounding Creek River Basin
Bow River Basin
Oldman River Basin
South Saskatchewan River Basin
Milk River Basin

Groundwater Consumptive Allocation

- There is no question that adequate water quantity and quality are prerequisites for investment and growth. Some northern municipalities such as the Towns of High Level and Falher, are also facing water shortage and quality issues. Many northern municipalities need assistance to develop adequate water treatment and distribution systems

- The impact of climatic change on water, and mans' contribution to climate change is being debated. However, a recent study, Sustainable Agriculture in Western Canada: Planning for Droughts Using the Past by Peter Leviatt, University of Regina, indicates that much of the prairies has historically been subjected to droughts greater than those experienced in the 1930s and that there is a high probability of similar major droughts occurring again.

  The techniques and findings of this study need to be repeated in other studies including the northern parts of British Columbia, Alberta and Saskatchewan. This is necessary to determine if the study's findings apply to these regions, and to confirm that the findings can be verified. One of the worst things that could happen is to implement policy that is based on faulty science. The Appendix provides further detail on the study.

  The study's key messages include:

  ✓ If their findings are accurate, Alberta may not have a great deal of time to prepare for a long-term major drought. The effects of drought could be catastrophic.

  ✓ The study states, "Briefly our drought prediction analysis clearly demonstrates that modern risk assessment models do not adequately capture the true frequency, duration and intensity of past droughts. Further, we suggest that present adaptive strategies and insurance models greatly underestimate future drought risk, especially considering the accelerating effects of global warming on drought occurrence."

  ✓ Their analysis shows that the probability of economically significant droughts (ie. Losses exceeding $75 billion per year occurring by 2030 is at least 22% in Manitoba and Saskatchewan and that risks rise to 40% in Alberta and North Dakota. Drought risk was higher at Chauvin Lake than at any of the other four prairie sites studied with a mean inter-arrival time of 60.5 years and an average duration of nearly 12 years.

  ✓ "Critically, our analyses show clearly that 20th century climate was comparatively benign and that past conditions were much more severe than those experienced during the modern agricultural era. For example, the 'dust bowl' of the 1930s was one of the mildest droughts of the past 2000 years; most droughts were both severe and longer-lasting, with an average of over ten years...Severe droughts of the 18th and 19th centuries may be the best models for expected impacts of future droughts...Of considerable concern is the observation that the most severe droughts of the past 2000 years (95th percentile) have an 18% probability of recurring by 2030."

- ✓ "Together, these patterns demonstrate that catastrophic droughts are a natural, regular feature of the prairie environment and have the capacity to seriously disrupt Canadian economy and society." "Drought onset is usually rapid and may prevent effective ad hoc adaptation to prolonged events. Past droughts have lasted up to 40 years. Increase use of preventative measures and reduced reliance on federal relief programs is recommended."

- ✓ Their findings indicate that current surface water availability is up to twice that of the last 2000 years. A return to low surface water levels would limit our ability to use storage technologies and the quality of the water will likely be reduced because of algae and sewage.

The implications of the Leviatt Report is of major concern. Further research needs to be conducted to confirm the findings. However, it would be prudent for regions, to take reasonable steps reflecting local situations, to manage water whether it is to prepare for shortages of water or to mitigate the potential of floods.

Conclusion on Scarcity of Water

Although in theory, northern Alberta has large amounts of water, this water is often in the wrong place, at the wrong time and is difficult to access. The real issue, particularly in Southern Alberta, is not that water is scarce, or that the quality is declining, but rather that of current water use practice, - who uses it and for what purpose.

Effective Water Management

- The focus of effective water management should be on conservation practices and priority use. Low-cost off-river alternatives for water storage should be considered. An option that has been suggested is using old river channels for storage.
- Inter-basin water transfer is environmentally risky due to the possible serious disruption of the ecosystem, including the transfer of organisms.
- Additional caution is required due to:
  - ✓ Doubtful cost/benefit results;
  - ✓ Increased contention over Aboriginal land claims and traditional area usage;
  - ✓ Possible further intrusion into provincial affairs by the federal government, particularly by Federal Fisheries and Oceans;
  - ✓ Potential objections raised by Northwest Territories, Saskatchewan and Montana;
  - ✓ Action that could be taken by the United States or American business because of the North American Free Trade Agreement (NAFTA);
  - ✓ Wealth (situations where price is no barrier to the purchase of water) could overcome the Alberta public interest; and
  - ✓ Current widespread public opposition could increase.

- There are examples of dams that have been built, and not withstanding that they provide a tremendous source of electric power and water storage, widespread complaints have arisen about low water levels at downstream communities, disrupted wildlife habitat, difficult boating and barging conditions and changed residential lifestyles.
- The Discussion Paper: Water Information Base Northwest Boreal Region identified the need for Federal and Provincial governments and other organizations to coordinate water involvement activities and to share information.[2] There is a great demand for a central clearinghouse of information where information on water sources and uses would be readily available. This information is required to make informed policies and investment decisions.
- Some concerns have been raised about the impact of the use of potable water in industrial applications such as for oilfield injection. Some aquifers and lakes are been drawn down because their surface water sources are unable to replenish them partly due to overuse.

Conclusion on Effective Water Management

The NADC does not support the assumption that effective water management will require significant investment in infrastructure for water storage (e.g. dams) and the maintenance of that infrastructure. Much can be done to change consumption practices in water scarce regions, before major investment in new infrastructure is required.

Economic Development and the Environment

Participants in the community workshops were asked if they agreed with the assumption that Albertans would have to choose between the sustainability of aquatic ecosystems and economic growth.

When initiating new projects, municipalities and developers must consider the implications and consequences of cumulative impacts of development on water quality and quantity. Anyone choosing to invest in a development should be aware of the implications of increasing demands for water, potential pollution impacts and waste water management. Investors also need to become more aware of opportunities where there are adequate supplies of water. It is critical that additional funding be provided to municipalities to assess and monitor their water sources in order to facilitate economic development while at the same time protecting the environment.

Conclusion on Economic Development and the Environment

The members of the NADC support the long-standing position of previous councils, that there must be a reasonable balance between economic growth and the environment. This is not an either-or dilemma. You need both.

---

[2] Discussion Paper: Water Information Base Northwest Boreal Region by Jerry Nessman, May 2001.

Water Safety and Pollution

- Highly publicized incidents of deaths and illness resulting from polluted water have increased the anxiety of Albertans relative to safe drinking. Liability issues have had widespread media coverage.

- Concern has been raised in northern Alberta over the use of potable water especially from lakes and groundwater for industrial and agriculture uses and the impact of these sectors on water quality and quantity.

- Aboriginal leaders stated that they have traditionally believed in protecting the environment whether it be water or land. "In anything that you do in the future always remember - It's Mother Earth who provides. If you destroy Mother Earth for the sake of industry or advancement, we'll all pay the price for it in the end.," Simon Waquan, Water in Northern Alberta Conference, 1987.[3]

Conclusion on Water Safety and Pollution

Increasing reluctance to take risks concerning the safety of water, and public perception of the degree of safety for consumption, will become major issues for municipalities, and provincial and the federal governments.

---

[3] Water in Northern Alberta, Conference Report, by NADC, November 1987

Objectives for a Water Strategy

The Northern Alberta Development Council agrees with the four proposed fundamental objectives for water strategy:

1. A safe, secure drinking water supply;
2. The knowledge necessary to make effective water management decisions
3. Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater; and
4. Reliable quality water supplies for a sustainable economy.

However, there are concerns regarding definitions and scope.

- For example, there is some question over the definition of 'healthy" and who gets to define this. Water levels in a lake naturally rise and decline. These changes improve the habitat for some wildlife at the expense of others. Various users are affected by these changes in water levels in different ways. Who determines what is a normal and acceptable health water level?

- The second area of concern is the extent of data acquisition that might be considered adequate to make effective water management decisions. Is this further research merely for the sake of further research? We already know that we should not pollute the water.

  Embarking on integrated resource management studies will be: expensive, time consuming, contentious, prone to failure to meet immediate needs in a timely manner and may not necessarily result in better decision making.

  The public might be better served if the focus of a water strategy is on investigating and implementing conservation practices, pollution mitigation, and the use of other existing planning frameworks such as forest management agreements.

Guiding Principles for Water Management

The Northern Alberta Development Council believes that the following guiding principles must be implemented to achieve these objectives:

- It is necessary to have broad overarching provincial policies on water management. However, these policies must be flexible enough to respond to regional priorities. There is considerable northern concern that a provincial water policy of "one size fits all" may be implemented. This would be highly detrimental to northern Alberta, which is still under developed. Although northern Alberta has some of the same water concerns as southern Alberta, it also has different concerns and priorities. Regions must be able to identify their priorities, and initiatives should be based on local conditions, major river basin and sub-basin management areas.

- A secure water supply for human consumption must take precedence over industrial or agricultural applications. There appears to be some confusion regarding priority rights in the current "First in Time... First in Right" policy between municipal use and other users such as irrigation and industrial users.

- Wise use of water should be a priority in water scarce regions and conservation practices should be implemented.

- The Province must be cautious about establishing policies that put a price on water and/or diverting it.

- Improving knowledge of water management and communication on water issues is critical. Departments must become more assertive in getting the message out concerning the role of the Alberta economy and its relationship with the environment.

Recommendations

The Northern Alberta Development Council recommends the following:

1. That the focus of water programs be on conservation and priority use.

2. Local and Regional conditions should be the basis for applying regulations or guidelines to management practices in the different areas of the province. The unique characteristics of major river basin and sub-basin management areas should be considered independently.

3. Improved water management practices should be considered, to protect the integrity of existing surface water and groundwater aquifers.

4. A review should be undertaken, of practices regarding the use of potable water, particularly from lakes and groundwater, for industrial and agricultural use.

5. Potential investors in developments that require large volumes of water, should be encouraged to adopt improved consumption practices, or to locate in areas where water supplies are more secure.

6. Inter-basin water transfer should not be considered as the risk is too high.

7. A thorough program to map all groundwater sources throughout the province, should be undertaken.

8. A review or water infrastructure programs for municipalities should be undertaken.

9. The system of gathering and disseminating water management information intended for public use should be improved.

10. Other matters relating to the use and management of water that should be considered include: accurate data acquisition, low-cost storage, municipal infrastructure, flood and erosion mitigation, pollution and wildlife habitat.

Appendix

Northen Alberta Development Council

Water Strategy for Alberta
The Challenges, Objectives and Guiding Principles: A Northern Perspective

Alberta

NORTHERN ALBERTA
DEVELOPMENT COUNCIL

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Groundwater[1]

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Groundwater Trends in Central Alberta
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Groundwater Trends in Northeastern Alberta

Sustainable Agriculture in Western Canada: Planning for Droughts by Using the Past[2]

Map of Study Area
Chauvin Lake Droughts
Chauvin Lake Droughts as an Impact of Global Warming
Chauvin Lake Drought Characteristics

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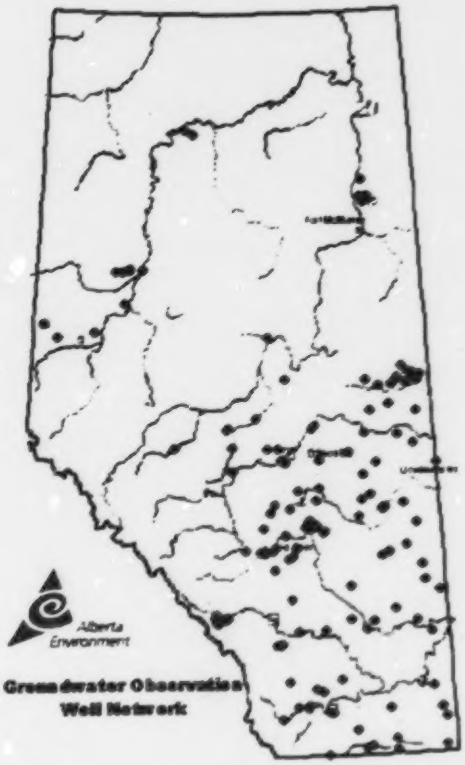
[1] Groundwater Management, Alberta Environment Powerpoint Presentation, Steve Claire

[2] The Past, Present and Future of Prairie Droughts: How Bad is Bad? Powerpoint Presentation by Peter Leavitt et al



Alberta Environment

Groundwater Observation Well Network

Drought Well Summary
September 2001

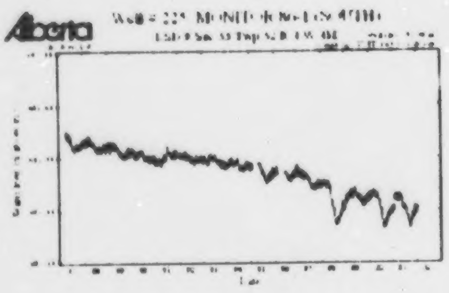
76% of the wells were below and much below average,

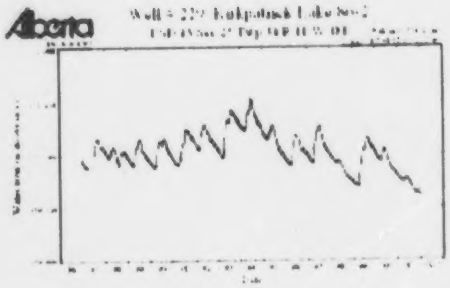
(45% were much below average)

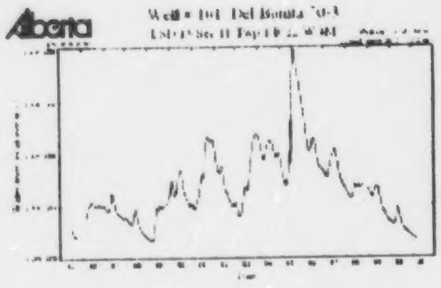
Buffalo North 86-2	Much Above Average
Pakowki 86-1	Much Above Average
Cluny 86-2	Above Average
Cressday 86-2	Above Average
Okotoks 2378E	Above Average
Oldman Dam Site #3	Above Average
Bigstone 2415E	Average
Barons 615E	Below Average
Barrhead	Below Average
Cavendish 2530E	Below Average
Devon #2 North	Below Average
Dickson Dam 4015	Below Average
Innisfree 2403E	Below Average
Ross Creek 2288E	Below Average
Sounding Creek 2533E	Below Average
Vegreville E.C. 86-1	Below Average
Cypress 86-1	Much Below Average
Del Bonita 70-3	Much Below Average
Derwent 2408E	Much Below Average
Duchess 2564E	Much Below Average
Grimshaw Kerndale	Much Below Average
Killam	Much Below Average
Kirkpatrick Lake 86-3	Much Below Average
La Crete 2358E	Much Below Average
Metiskow 88-3 (east)	Much Below Average
Milk River	Much Below Average
Narrow Lake	Much Below Average
Sibbald 86-2	Much Below Average
Watino 2353E	Much Below Average

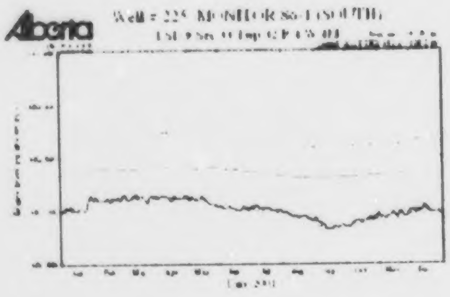
Ground Water Trends in Southern Alberta

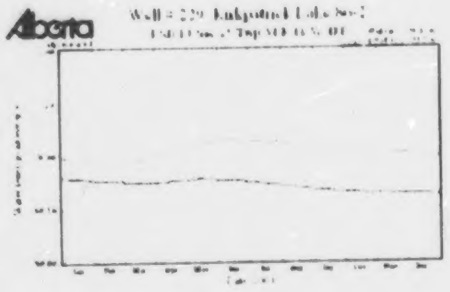
- Monitor area
- Kirkpatrick Lake area
- Del Bonita

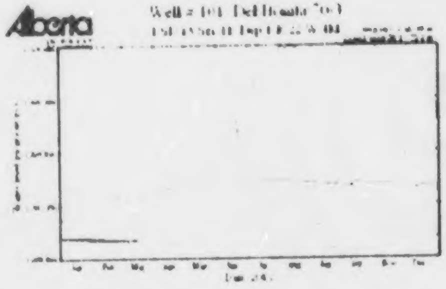






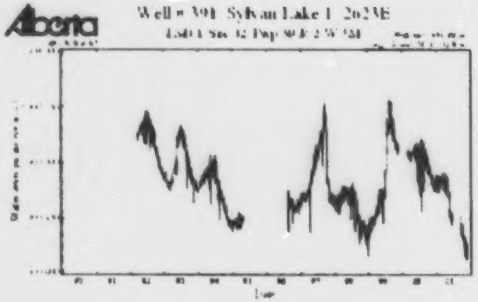


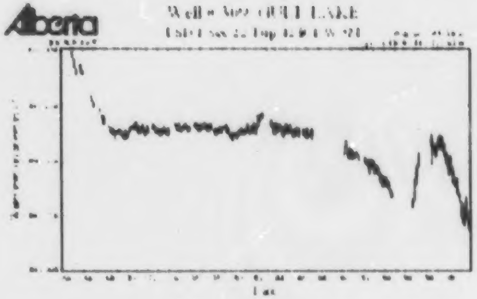


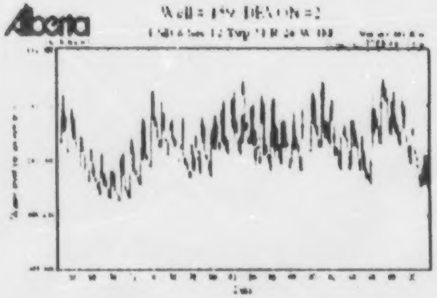


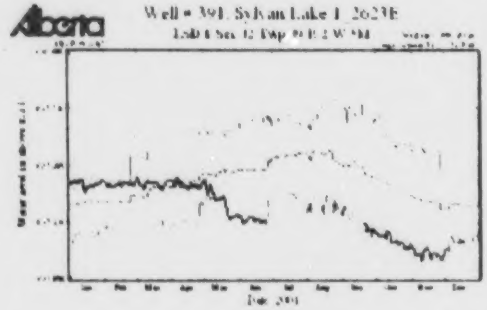
Ground Water Trends in Central Alberta

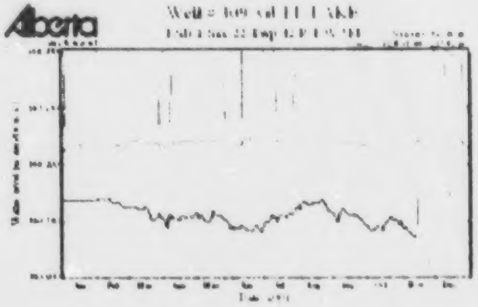
- Sylvan Lake area
- Gull Lake area
- Devon area

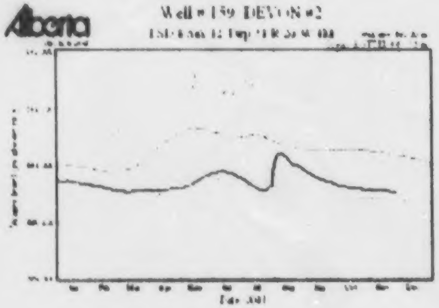






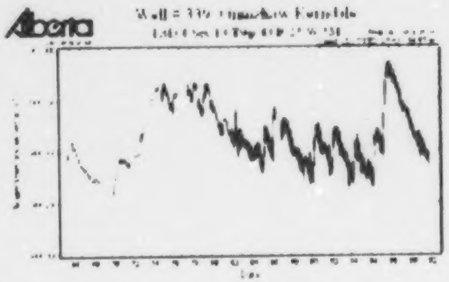


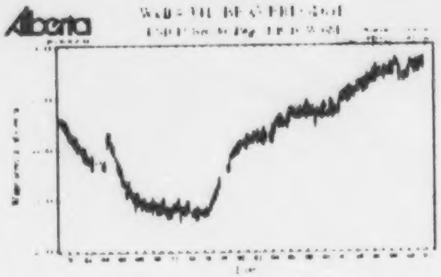


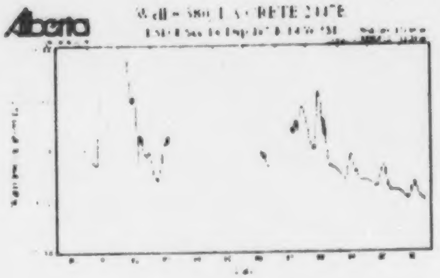


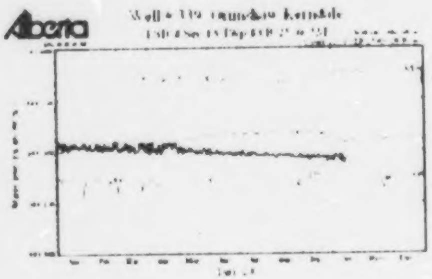
Ground Water Trends in the North Western Alberta

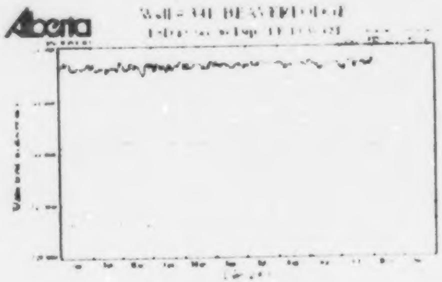
- **Grimshaw Gravels Aquifer**
- **Beaverlodge Sandstone Aquifer**
- **La Crete area**

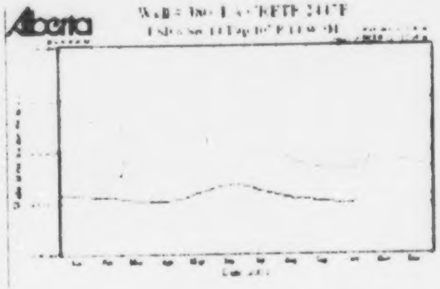






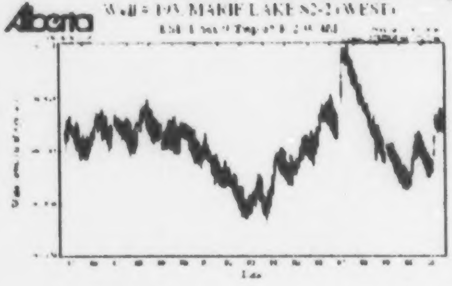


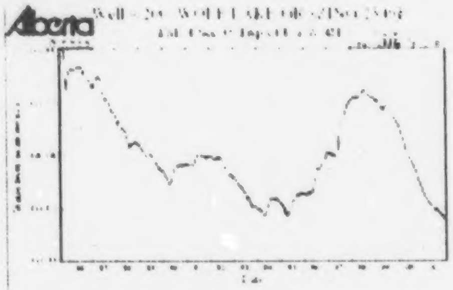


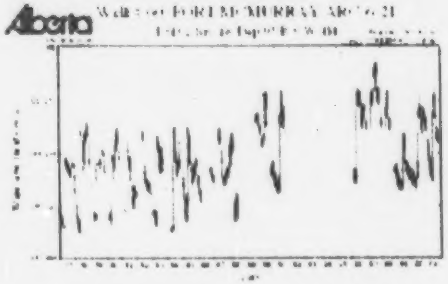


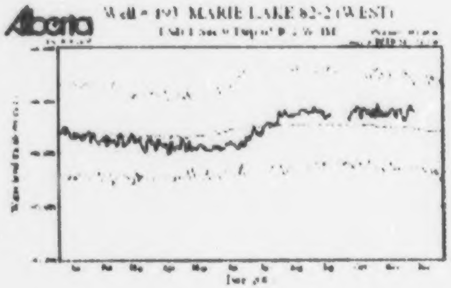
Ground Water Trends in the North Eastern Alberta

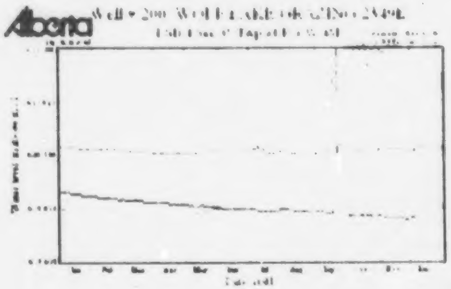
- Marie Lake area
- Wolf Lake Grazing Area
- Fort McMurray area

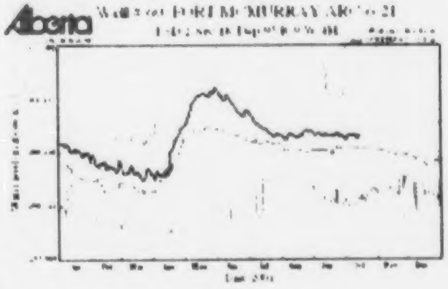












31. Red Deer County

Red Deer County

Phone (403) 350-2152 Fax (403) 350-2164

Fax to
(780) 422-6259
original to follow
by mail

April 29, 2002

ATTENT. Bev YEE

RECEIVED
Client Relations Unit
Alberta Environment
MAY 1 2002
AR # 3922
File #

Honorable Lorne Taylor, Minister
Alberta Environment
423 Legislature Building
EDMONTON, AB T5K 2B6

Dear Doctor Taylor

Re: Water for Life, Strategy for Sustainability

This is in response to your department's request for input to the Water for Life Strategy. Rather than fill out a series of questions, Red Deer County has elected to answer as a single presentation. This letter will attempt to articulate the position of Red Deer County.

The County holds two general views:

1. The province of Alberta is in the best position to evaluate water needs within various geographical areas of the province and the ongoing impact of water supply versus user needs. Red Deer County does not possess the expertise or resources to undertake this evaluation.

2. The water supply contained in the rivers and streams of Alberta is a resource that should be available to all municipalities based upon current need, availability of supply and interprovincial agreements.

   As a way to enlarge upon and answer the basic questions in the survey the following comments are offered:

a. We do not agree with the principle enshrined in the Water Act "first in time, first in right." While we agree there is a need to provide some protection for consumers who have made investments, many of the original licenses contained rather arbitrary limits and the full extent of the license has never been used. It is our understanding that during a time of tight water supply, the basic supply for human consumption or a higher need agriculture venture (Dairy operation) might be restricted because as quoted the "older license has priority, regardless of how the water is being used." We find that principle unacceptable.

b. We do agree that water is a valuable resource that needs protecting and conservation practice should be part of any future strategy effecting all users equally regardless of the priority rights of a given license. Valuable should not be misconstrued with monetary value. To make water a commodity where it goes to the highest bidder only gives those "first-in-cue" or "with the deepest pockets" a big economic advantage over equally competing rights. To place a high monetary value on water might be one of the effective ways to encourage conservation, but there are other ways to accomplish the same end. To allow the sale of an unused portion of a license would be granting one licenser the right to sell a natural resource that belongs to all of the people of Alberta. We cannot agree with that philosophy. Any unused license portion should be returned to the pool and allocated using equally competing principles.

c. The Province needs to establish a hierarchy of needs that defines clearly how water will be allocated during times of scarcity of supply. If you followed the Water Act to the letter, the first license issued would get the last drop of water. Should basic human needs compete with oil well flooding or irrigating of arid land, which are by far the largest consumers of water in the province.

d. Simply charging users within a municipality for the water removed from a river, lake or groundwater source as a way of affecting conservation, unless it was blended with a equal tax incentive for meeting conservation standards, would be seen as a tax grab.

e. Meeting our interprovincial obligations is very important. However, restricting the normal growth in the Red Deer basin because the Bow and Oldman Basin users have exceeded their respective allocations is not acceptable. At some point, a balance must be struck between the competing needs. A decision to restrict development cannot be based on the fact that the water license for pouring water on the arid land in the Oldman basin was issued 20 years before the economic development was even considered in the Red Deer river basin. Each basin must balance and meet its share of the interprovincial commitment or independently face rationing until it does.

f. River basins' ecosystems must be given a very high priority and maintaining a healthy aquatic environment should never take second place to economic development. A way to coexist can nearly always be found at the expense of some loss in profit.

g. The transfer of water from one river basin system to another should be considered very cautiously. Economic development should be encouraged to move to the available water rather than moving the water to another area to encourage competing development. Within the area of possible exception, approvals should be the considered for large community based water and sewer systems that improve and protect the larger community and the environment. The wholesale transfer of water from one river basin to another should not be considered until all the impacts have been studied closely.

h. The continued use of a very large volume of potable water for Oil Well Flooding operations during times of shortage is a practice that needs serious review. There are a number of alternatives available to the oil companies. Granted that, moving away from fresh water may erode the profit margin somewhat in the short term, but given the challenge, the ingenuity of the companies may be surprising. Continuing to pump large volumes of usable water down a hole in times of shortage would be unacceptable.

Red Deer County hopes that these comments will be helpful in your deliberations, and we wish you our very best as you formulate a fair and objective strategy for the future.

Yours truly

RED DEER COUNTY

Gregg C. Johnson
Reeve

nel
c AAMD&C

#411

Wild Rose Agricultural Producers

Discussion Paper on Water Quality, Quantity And Export

November 2001

This discussion paper was drafted in response to the following resolution passed at the 2000 Wild Rose Annual Convention.

Whereas Alberta's agricultural production depends on the availability of water and markets, and
Whereas Alberta has abundant water available in certain areas, and
Whereas agricultural production from nations which compete with our domestic markets is also dependent on reliable water, and
Whereas even though our governments deny the possibility, the potential export of water is a frequent topic in the media;
Therefore Be It Resolved that Wild Rose Agricultural Producers develop a paper to explain the benefits for the Alberta economy of developing and promoting agriculture in Alberta, rather than exporting water.
Be It Further Resolved that Wild rose Agricultural Producers' members encourage the commodity groups that they are involved with to provide input to Wild Rose on the economic benefits to farmers and the Alberta economy that will accrue as a result of producing food and products for domestic and export markets, rather than exporting water itself.

Wild Rose Agricultural Producers would like to thank Rachel Bocock for the research and completion of this project.

For Further information contact:
Rod Scarlett
Executive Director
Wild Rose Agricultural Producers
14815-119 Ave. Edmonton, T5L 4W2
Telephone: 780-451-5912

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Note: words that are bolded have definition provided in the glossary

Introduction

Farmers have done much over the past few decades to improve their relationship with the environment. This relationship is one of mutual dependence. Farmers rely on the environment to provide them with the natural resources they need to produce their products. The health of the environment, in turn, depends on agricultural producers practicing sound environmental land and livestock management. Water especially is vulnerable to the impacts of agricultural activities, while at the same time being an indispensable resource of the agricultural community.

Of the renewable resources Alberta Environment identifies water as being the most important one as "it is the most basic requirement needed for survival by all living things"(Alberta Environment 1999, 1). For agricultural producers water is the most important input for crop and livestock production. Thus preserving the quality and quantity of water sources is central to ensuring the viability of agriculture.

In turn, health of the agricultural community affects the economy as a whole. Agriculture is one of the larges consumers of water but it is also a $7.3 billion business in Alberta (Alberta Agriculture 2001, 1). According to the Alberta Irrigation Projects Association, "Primary agriculture is Alberta's largest renewable resource sector and creates more jobs than any other provincial industry directly and indirectly"(---).

This paper will explore the relationship between agriculture and water. The first chapter will examine the impact of agriculture on water quality and how farmers are working to improve water quality in their areas. The second chapter deals with the issue of water quality. Although Canada has a relatively abundant supply our agricultural community can face shortages. There must be more focus on the part of citizens and the government to reduce demands on water sources along with creating strategies to increase the supply of water. The shortages of water that the prairies face, in particular, make the export of water a poor proposition. The third chapter will address proposals to export water to the United States. Governments at all levels in Canada must tighten legislation to ensure that water cannot be exported under the terms of international trade agreements.

As can be expected for one of the larges countries in the world, Canada has one of the greatest supplies of freshwater. Environment Canada reports, "We have about 20% of the Earth's freshwater, but only 9% of the world's renewable freshwater supply, the rest is fossil water, water left over from the ice ages trapped in ice, snow, glaciers, etc"(2001, 4). Because Canada is a guardian to such a large amount of one of the earth's most precious resources we have a special responsibility to preserve the quality and quantity of water, not to export it to other countries. Farmers, as one of the largest consumers of water in Canada, have extra responsibility to practice effective stewardship of this resource.

Chapter 1: Water Quality

Water quality has become a central public concern in the past few years. A recent nation-wide opinion pole found that people think water quality " . . . is the most pressing environmental issue in Canada today"(Coote and Gregorich 2000, 2). Since the recent events in Walkerton, North Branford, and elsewhere, questions are being raised about what is affecting the quality of water and what should be done to remedy the situation. Blame is often placed on the agricultural community, among others, for compromising the purity of water supplies. How the agricultural community responds to concerns about water quality will play a major part in shaping its public image.

On a global scale Canada's agricultural sector has a healthy reputation. For example, US government agencies estimate that 50 to 70 per cent of their assessed surface water has been contaminated by agriculture.[1] In comparison Canada has a "green image". This bodes well for Canada as, "in the many global markets looking for environmentally friendly and healthy foods, that image translates into healthy profits"(CAESA 1998, 5).

Nevertheless, Agriculture in Canada and Alberta has contributed to the degradation of water supplies. While the focus of this chapter is on the effects of agriculture on water, it should not be forgotten that the agriculture industry constitutes only one of the users of water who may degrade water sources. It should also be kept in mind that the agriculture industry has changed its practices over the years in order to become more environmentally friendly.

Furthermore, it is difficult to assess precisely what the effects of agriculture are on water supplies. Government researchers explain that measuring the impact is complicated by many factors including the

- difficulty in tracing chemicals back to **non-point sources**
- high costs of monitoring
- large number and diversity of farms, soil types, and farming practices
- time lag between when a substance is applied to the land and when its environmental effects may become evident.(Coote and Gregorich 2000, 32)

Despite these problems, an overall picture of the relationship between agriculture and water quality has been developed. We know that the main agents of water quality decline coming from agriculture are bacteria, nitrogen, pesticides and sediment (Coote and Gregorich 200, 32; Alberta 2001, 1). In turn, all of these substances negatively impact the agricultural industry when they enter the water supply by causing health problems in humans and animals and by reducing crop yields (Alberta 2001, 2). Therefore it is in agricultural producer's best interest to continue to reduce the amount of these agents reaching water sources.

Bacteria

Bacteria are the agents causing most concern among members of the public at this point in time. The word Bacteria when used in reference to water quality is meant to denote substances such as Enterococci and Escherichia coli (E coli), which are found in water due to contamination by animal or human waste. Not all bacteria strains are injurious to human and animal health. It was E coli O157:H7 that was responsible for the deaths and illness in Walkerton Ontario during the spring of 2000 (Alberta Agriculture 2001, 3).

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[1] This fact raises concerns about the ability of the US to fulfill its demands for water without importing from Canada, an issue that will be discussed further in Chapter 3.

Intensive livestock operations are often singled out as sources of this type of contamination. Unfortunately concern about the impacts of intensive livestock operations on water is not wholly unfounded. Data from Ontario "suggests that intensive livestock operations can be a **point source**" (Alberta Agriculture 2001, 3). In Alberta research has found intensive agriculture in general to be the cause of bacteria contamination. One study reports,

> Fecal Coliform Bacteria levels nearly always exceeded human drinking water quality guidelines in small streams in all agricultural areas. For dugouts, drinking water guidelines were exceeded more often in Southern Alberta, than in the Peace River area of northern Alberta. (CAESA 1998, 29)

Still, it must be kept in mind that intensive agriculture is not the only source of contamination. Wildlife who have access to streams and rivers can be one source and human activity another (CAESA 1998, 29).

When looking for ways to reduce the contamination of water supplies, the agricultural community must not be made the sole focus. Human activities continue to be an important factor. In Walkerton blame is currently being placed on the way in which water was managed (or mismanaged) by the government, not on the agricultural community (Perkel 2001, 1).

Still the incidents have damaged the reputation of agriculture. The community will likely be called upon to improve its practices and will have to be prepared to do so. A look at how bacteria contamination can and is being prevented by farmers will be looked at in tandem with how nutrient contamination can be reduced as the two problems are closely related.

Nutrients

Nutrients share the dubious distinction with bacteria of being the most common contaminants of water worldwide (Alberta Agriculture 2001, 1). Nutrients derived from agricultural practices include nitrogen, its dissolved form - nitrate, and phosphorous. For the sake of this discussion the focus will be on nitrogen and nitrate as phosphorous is not thought to effect human health and as such, there are no drinking or recreational water guidelines regulating its presence in water sources (Alberta Agriculture 2001, 3). It is of concern that phosphorous, along with nitrogen, can cause eutrophication (or premature aging) of surface waters due to the acceleration of plant growth, and increased amount of algae and depletion of oxygen (CEASA 1998, 27). Still, nitrogen and nitrate are the focus of greater concern due to their effects on human health. Nitrate in particular has been marked as a cause of stomach cancer and reproductive problems in humans and lower productivity in livestock (Alberta Agriculture 2001, 2). Reducing the amount of Nitrogen and Nitrate in the soil is, therefore, in the best interest of farmers as well as the general public.

Fertilizers and manure are the most common source of nutrients (Alberta Agriculture 2001, 2). Although Nitrogen and Nitrate can seep into groundwater from any farm where fertilizers and manure are present, contamination is most likely to occur in areas of "intensive cropping of corn, potatoes and specialty crops, where large amounts of nitrogen are often applied." Leaching of nutrients is also likely to occur around intensive livestock operations where manure is improperly stored or too much is spread on fields (Coote & Gregorich 2000, 51). To back up this assertion, a study was done in 1998 comparing the levels of nitrogen in over 800 streams in areas with different degrees of agricultural intensity. Where the intensity of farming was high 87% of streams tested exceeded provincial guidelines for aquatic life, where intensity was moderate 65% exceeded this guideline and where intensity was low 32% exceeded the guideline (Coote and Gregorich 2000, 51).[2] These facts do nothing to improve the image of intensive agriculture. However, they may be somewhat misleading.

It is important to note that nitrate levels in Canada today are the same as they were in the 1940's (Coote and Gregorich 2000, 67). This demonstrates that increases in the intensity of livestock production have been offset by improved farming practices. Furthermore, high nitrate levels are not only caused by intensive agriculture. Coote and Gregorich report that high nitrate levels have been recorded in groundwater in areas where only geological sources were present, showing agriculture is not always the source of nitrate"(2000, 67). Facts such as these must be taken into account before blaming agriculture for every incidence of nutrient contamination.

Reducing Nutrients and Bacteria in Water Supplies

Ways to prevent bacteria and nutrients from entering bodies of water coincide to a large extent as both have manure as a main source. Although nutrients can also stem from chemical fertilizers, methods of preventing nutrients from chemical fertilizers entering water sources are similar to those of reducing contamination from manure.

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[2] Guidelines for aquatic life are stricter than water quality guidelines.

There are a number of ways to reduce the amount of nutrients and bacteria making their way from agricultural lands in the watercourses. Here is just a sample of what can be and, to a large extent, is being done:

- Producers can test soil for nutrient content and apply fertilizer according to a nutrient management plan. The 1995 Farm Inputs Management Survey indicated that 60% of Canadian Farmers use soil testing with about 75% of them testing every 1 to 3 years. Increasing the number of farmers testing their soil is key to reducing the amount of fertilizer put on the land. Provincial governments used to provide funding for soil testing but withdrew this service. It would serve the public interest well to restore government funding in this area to facilitate the reduction of nutrient and bacteria contamination of water. (Coote and Gregorich 2000, 99).
- It is also important to know the nutrient content of manure in order to calculate the amount of manure that should be applied to the fields. The nutrient content of manure varies depending on the type of animal that produced it and the type of feed this animal was fed, as well as the way the manure is stored. (Coote and Gregorich 200, 100)
- When manure is applied to fields it should be mixed into the soil to avoid run off. This means that manure or any fertilizer should not be spread on frozen ground (Coote and Gregorich 200, 100)
- Modifying grazing patterns can also prevent water from being contaminated by bacteria and nutrients. To prevent run off from manure in the spring cattle should be wintered away from water bodies, and in large areas to reduce the concentration of manure (CAESA 1998, 39).
- To further reduce the risk of contamination, providing a vegetated strip around water bodies where animals are present or fertilizer is being spread reduces the amount of nutrients and bacteria reaching these bodies, as vegetation will absorb much of these substances (CAESA 1998, 39).

As feedlots are often singled out as a source of contamination, preventing runoff from feedlots should be a high priority of owners. To do this CAESA water quality committee recommends:

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- Install good drainage systems and proper catch basins.
- Thoroughly clean unused feedlot pens promptly after cattle are removed.
- Remove snow and manure from feedlot pens before the ground thaws in spring.
- Locate feedlot facilities on gently sloping sites, away from watercourses.
- Avoid sites with porous oils and areas with shallow groundwater. (CAESA 1998, 41)

Many farmers are already following these practices to prevent contamination of water surfaces. They realize that reducing water contamination is to their benefit. A Farm Application Study found that "nutrient losses due to runoff from some fields represented a significant proportion of the total nutrients applied to the field. These nutrient losses were a considerable economic loss to the farmer"(CAESA 1998, 38). This demonstrates that conservation is not necessarily in conflict with economics.

Pesticides

As the intensity of agricultural operations has increased, so to has the use of pesticides. According to government research "pesticides are often detected in irrigation return flows, streams, rivers, lakes and Wetlands"(Coote and Gregorich 2000, 56). The levels detected are usually within the guidelines for most water use. A survey of streams in Alberta between 1995 and 1996 found pesticides in 44% of the samples but almost all were below guidelines (Anderson et al 1997, 48). Pesticide detection in wells has also been below water quality guidelines: "Commonly used agricultural herbicides were detected in 3% of 824 domestic wells sampled across Alberta in 1995; three detections exceeded water quality guidelines" (Alberta 2001, 4).

Although most levels of pesticide found in water supplies meet health and environmental requirements, there is still cause to be concerned about pesticide levels. The provincial stream survey found that non-compliance with irrigation water guidelines [] occurred frequently" (Anderson et al. 1997a, 49). Researchers warn, "Herbicide levels above guidelines may lead to lower crop yields . . ."(Anderson et al. 1997a, 49). Again, this demonstrates that preventing contamination is in the best economic interest of producers.

Like bacteria and nutrients, levels of pesticides found in water correlates with the intensity of agricultural operations in the area. A study of lakes in Alberta found, "In areas with high pesticide use, detection frequency was 90% for lakes located in areas of high runoff"

(Anderson et al. 1997b, 52). All detections but one were within guidelines (Anderson et al. 1997b, 52). However, the same project found that not all pesticide detection could be attributed to local use. Researchers suspect that "atmospheric transport contributed to surface water contamination (Anderson et al. 1997b, 52). Still this does not negate the correlation between the intensity of agriculture and the detection of pesticides.

It should also be kept in mind that not all pesticides in prairie water are derived from agriculture. Coote and Gregorich note, "For example, higher concentrations of herbicides such as 2, 4-D have been observed downstream of Edmonton and Winnipeg than upstream of these cities. This increase has been attributed to the use of 2, 4-d on lawns, parks, and golf courses" (2000, 56). It is therefore necessary for non-agricultural users of pesticides to do their part to reduce the amount of pesticides reaching water bodies.

Narrowing down the source of pesticides found in water is one of the obstacles of assessing pesticide study results. Alberta Agriculture, Food and Rural Development has exposed other problems in interpreting research results.

- Guidelines do not exist for many pesticides.
- Guidelines do not apply to water containing a single pesticide, but 30% of farm wells with pesticides contained more than one.
- The frequency of pesticide detection increases significantly as analysis becomes more precise.
- Current data suggest exposure to even low levels of pesticides can affect humans and aquatic life in ways that are not considered by current guidelines, including effects on endocrine, nervous and immune systems, particularly due to fetal exposure.
- The Canadian guidelines often allow for higher pesticide concentrations than allowed by the European Commission.
- Pesticide concentrations may vary substantially on a seasonal basis; so frequent sampling is often required to determine true levels.(2001, 4)

The government should, therefore, take more of the responsibility to ensure that pesticides are not compromising the purity of our water. A 1997 study found that guidelines do not exist for many of the commonly used pesticides. It is essential for the provincial or federal government to test these substances to get an understanding of their effects on the environment and animal health in order to properly regulate their use (CAESA 1998, 5). Agricultural producers should be able to rely on the government to provide them with information regarding the safety of the products they depend on.

Reducing Pesticide Contamination

Despite problems in assessing data, farmers must make sure that their contribution to pesticide levels in water is kept to a minimum. There is much that farmers have and should do to reduce or eliminate the amount of pesticides reaching sources of water.

Measures to reduce pesticide contamination center around limiting the amount of pesticides placed on fields. The Canadian Government advises farmers to:

- monitor pests to see if pesticide is really needed
- select products that are target specific; least persistent; and of low toxicity, low vapour pressure, and low susceptibility to leaching
- follow the guidelines for application rate and conditions
- choose application methods that direct the pesticide at the appropriate target rather than generally applying it to a whole field
- calibrate application equipment regularly (68% of farmers calibrated their equipment at the beginning of the season, only 16% recalibrate between applications) (Coote and Gregorich 2000, 102).

Reducing the amount of pesticides used in this way has a double benefit for farmers. Not only are they protecting the purity of their water, they can also save money by spending less on pesticides.

Sediment

Pollution of water by sediment also represents a financial loss for farmers. Sediment represents soil particles that have drifted into water bodies due to erosion. Thus, not only is the suitability of water for human and animals reduced if the water becomes highly **turbid**, but farmers lose highly valuable topsoil due to erosion along with the inputs into that soil. The government of Canada found that "mineral fertilizers, pesticides, plant residues, animal manure, and in some cases pathogenic organism can be carried off farmland by eroded soil particles, further polluting downstream waters"(Coote and Gregorich 2000, 35).

Farmers have done much in the past two decades to decrease erosion and consequently contamination of water by soil sediment. Through making changes to cropping systems by reducing tillage and the amount of land left under summer fallow as well as by blocking animals' access to streams, farmers have reduced the risk of water erosion in Alberta as well as Saskatchewan, Manitoba, Ontario and New Brunswick (Coote and Gregorich 2000, 44 & 47). Due to the reduction in erosion fewer contaminants such as nutrients, pesticides and bacteria have been entering water bodies. However reduction in erosion alone will not prevent these agents from reducing water quality. Recommendations as listed above should still be followed.

Reducing Sediment

Proper land management reduces sediment-reaching watercourses. There are several different techniques that farmers can use to prevent erosion. The technique that farmers' use will depend on the type of soil and climate they are working with and the kind of crops they are growing. Rotating cultivated crops with forage annually and eliminating summer fallow is a method that can be used where soil moisture is adequate (Coote and Gregorich 2000, 92). The number of days a year that soils are left without cover, bare soil days, have declined between 1981 and 1996 from 98 to 78 days (Coote and Gregorich 2000, 95).

Conservation tillage is another method that farmers are using to reduce erosion. This type of tillage leaves a residue of approximately 30% of the previous crop in the soil, reducing surface runoff in this way. Additionally, the residue left in the soil improves the soil structure making it less susceptible to erosion, thereby preserving one of our most precious natural resources – topsoil. Farmers who are using this method are seeing the results first hand. Research shows that "for cereal grains grown in the Peace River area of British Columbia, annual rates of erosion were reduced by about half with reduced tillage, . . ."(Coote and Gregorich 2000, 94).

However reducing tillage is not a problem free solution to erosion. A side effect of reducing or eliminating tillage is that more organic matter is left in the soil, which increases the amount of phosphorous, available for runoff as the material decays. In addition the organic matter cools and dampens the soil with can delay seeding in years of high precipitation or areas with high clay content (Coote and Gregorich 2000, 96). It is therefore not feasible for all farmers to adopt conservation tillage at this point.

Creating buffer zones and shelterbelts is one of the most effective ways of reducing erosion and surface runoff. Numerous studies conclude that " . . . the filtering capacity of buffer zones reported sediment-trapping efficiency ranging from 50% and 90% for grass buffer strips 1 to 9 meters wide"(Coote and Gregorich 2000, 103). At the same time this practice reduces the amount of nitrogen, nitrate and pesticides reaching the water. Nitrogen can be reduced by 63 to 76%, nitrate 27 to 57% and pesticides 32 to 55% with four to nine meter bands (Coote and Gregorich 2000, 103/104). Buffer zones are thus a simple way to improve the overall quality of water and can be done under any weather, soil and crop conditions.

Conclusion

Despite improvements in agricultural practices questions still remain about the sustainability of the agricultural industry in terms of the availability of water. Results of a study done under the Canadian – Alberta Environmentally Sustainable Agriculture Agreement (CAESA) " . . . clearly show that current agricultural management practices on many farms are not adequate to sustain water quality, particularly in the high and moderate intensity agricultural areas of Alberta"(1998, 32). As noted throughout this discussion, there are still major gaps in the knowledge about causes, sources, and effects of water contamination. The further development of practices that will maintain the quality of Alberta's water necessitates that understanding of this process be improved and more information be made available to farmers. For this reason CAESA recommended that education be at the heart of any policy initiative on water conservation (CAESA 1998, 32&33).

It is in farmers best interest to preserve and improve water quality: "The benefits they reap by reducing pollution resulting from agriculture may include greater efficiency and productivity, lower production costs and improved health for their families and animals"(Coote and Gregorich 2000 91). If farmers are to take further steps to preserve the quality of water, they will need more support from the government in terms of research and financial assistance. Furthermore, other users of water must also be held accountable for their impact on the quality of water.

Everyone must share this precious resource and work to preserve its integrity. Water is not an infinite resource. As the next chapter attests there are limits to the availability of water. Consequently, we must ensure that what quantities we have are not rendered unusable by contamination.

Chapter 2: Water Quantity

When thinking of the vast amount of lakes, streams, rivers and dugouts, it is easy to assume that there is an unlimited supply of water in the prairies. However, history has shown that we cannot take the abundance of our natural resources for granted. Supply often runs short of demand as precipitation fluctuates and an increasing number of water users place a strain on the water supply. Canadians are next only to Americans in the average amount of water each person uses daily (Cootes and Gregorich 2000, 21). Our belief that water will be an ever abundant resource has lead us to over use and mismanage our supplies to a point where the availability of water in the future is now in question.

Due to the limitations of supply, water distribution is often seen as a competition of different demands (Dinar and Letey 1996, 1; Coote and Gregorich 2000, 132). Agriculture's use of water, for example, is seen as coming at a cost to availability and purity of domestic drinking water. However, Ariel Dinar and John Letey argue that water use should not be seen as a competition. They point out, "all humans depend on agriculture to provide food and fiber; on industrial use to enhance the quality of life; on domestic use for drinking; sanitation and comfort; and on a diverse ecological system to provide stability and aesthetic value"(1996,1). Instead of putting various sectors of life in competition with each other for water, as a society we should all be looking for ways to conserve our water resources as individual users and as a whole.

Agriculture must be at the center of any water management scheme as it "occupies such a large land base and agricultural producers are themselves major users of water"(Coote and Gregorich 2000, 131). Agricultural activities are among the five main **consumptive** uses of water along with thermal power, municipal, industrial and water injection withdrawals (Alberta Environment 1999, 1).[3] The agricultural industry is likely to become a greater consumer of water as provinces work to expand the value-added sector. For example, in 1995 the government of Alberta challenged the agriculture sector "to become a $20-billion manufacturing industry by 2005"(qtd. in Coote and Gregorich 2000, 132). In order for the expansion of agriculture to be sustainable, agricultural producers must introduce greater efficiencies to their operations.

The need for conservation is greatest on the prairies, as they constitute the driest region in Canada. Within Alberta the northern regions are the wettest with the high mountain country receiving annual precipitation of about 1500mm. In contrast the southern regions, where most agricultural activity occurs, receive the least amount of precipitation. For example, the area north of Medicine Hat has an average of 250mm of precipitation a year (Alberta Environment 2000, 2). On average, the levels of precipitation that agricultural lands in Alberta and the rest of Canada receive do not provide the optimum conditions for plant growth: "agricultural land receives an average of [only] 300 to 500 millimeters of precipitation per year" (Coote and Gregorich 2000, 11). The shortage is best represented by the measurement of soil moisture deficit:

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[3] There are many uses of water such as hydro electric production and recreational activities where the water remains in or is returned to its source. Some of the water used to by agriculture is returned. However, agriculture **consumes** over 70% of the water it uses, meaning this water is not returned to its source (Coote and Gregorich 2000, 16).

> The difference between the total precipitation during the growing season, together with the amount of water that can be held in the root zone of the soil, and potential evapotranspiration is called the soil moisture deficit. This value tells us by how much the land is actually short of water compared with amount of water plants could use if it were available. Most of western Canada where agriculture is found, as well as southern Ontario, suffers from soil moisture deficits in an average year. (Coote and Gregorich 2000, 7)

Due to the soil moisture deficit much of the agricultural industry relies on irrigation to supply the needed moisture to grow high quality crops.[4] As such all farmers are extremely vulnerable to any drop in precipitation.

The moisture deficit becomes even more acute in times of drought. Drought devastates crop and grazing land and depletes water bodies, affecting every type of agriculture. Unfortunately, the federal government reports, "global warming scenarios show that drought frequency and severity are expected to increase where precipitation does not make up for the increased water losses from evaporation"(Coote and Gregorich 2000, 112). In June of 2001 a US National Academy of Sciences report on global warming commissioned by the White House as a primer for President George W. Bush states that "there is general agreement that the observed warming [of the earth] is real and particularly strong within the last 20 years"(Sandor 2001,7). This is a warning that prairie residents must be prepared for long term water shortages.

In the past, measures to alleviate water shortages have centered on the supply of water. Although this has satisfied demand up until now, there are concerns that in times of shortage in the future, increasing the supply of water may not be an available option. In a report on

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[4] Even though the prairies have a soil moisture deficit, they still provide a more suitable environment for agriculture than more southern regions of North America which wish to import water from Canada. This issue will be covered in further detail in the subsequent chapter.

"Maintaining Reliable Water Supplies", the development of storage facilities is used as an example of this problem. Its authors argue,

> The increased storage capacity for water intended for drought protection may be used indiscriminately during years without drought, creating new water demands. The creators of these new demands then become reliant on new reservoirs as a permanent source of supply, and the ability of reservoirs to act as back up source for original users is impaired. When drought recurs, the impacts would likely be even greater than if new reservoirs had never been built. (Coote and Gregorich 2000, 113).

This problem became evident during the droughts of 1980s when many individual and community water supplies where not able to fill the needs of these consumers. In many of these areas conveyance works (canals, pipelines and pump plants) as well as diversion works (interbasin transfers and damns) were put in place to alleviate the situation. With ever increasing, demand it is still questionable whether these diversions will be sustainable in extended dry spells (Coote and Gregorich 2000, 113 -114).

Programs that create or provide access to a greater number of water sources are placed under the category of supply management. The Alberta Government continues to base its water programs on supply management practices. For example, the Alberta Farm Water Program (AFWP) was recently developed to ". . .provide access to previously unused water sources, or increase the supply of water"(Alberta Agriculture 2001b, 1). The program aims to exclude unsustainable projects such as water hauling and small scoop-outs. Instead the program intends to facilitate "long term projects . . . that result in adequate, sustainable, on-going water supply over many years, such as wells, pipelines, dugouts, stock dams . . . etc"(Alberta Agriculture 2001b,1). The farming community should welcome the $20million allocated to the development of water sources for agriculture. There is a need for more, stable water sources if agriculture is to continue expanding. Nevertheless, demand management programs should balance supply management programs, such as the AFWP, in order to be truly sustainable.

The need for demand management as opposed to unsustainable demand management is a major reason not to export Canada's water. All countries should be looking for ways to reduce the demands placed on their water systems rather than seeking out sources from abroad. Canada itself must be looking for ways to better manage its water rather than trying to supply the rest of the world.

Irrigation

One of the key concerns around water management is the availability of water for irrigation. The irrigation industry is by far the largest user of water resources, even though it does not consume all that it uses (Alberta Environment 1999, 4). Although irrigated agriculture can place a strain on the water supplies of Alberta, it also plays a key role in the economy of the province. Furthermore, there are number of ways that the irrigation industry is improving the efficiency of water use. The irrigation industry can continue to produce world-class products well into the future so long as the industry, in cooperation with the larger community, continues to develop its water management practices.

There is a high concentration of irrigated agriculture in Alberta due to the suitability of Alberta's environment for the production of irrigated crops. A staggering 60% of the irrigated cropland in Canada is in Alberta (Coote and Gregorich 2000, 17). The type of soil and quality of water that exists in Alberta is well suited for irrigation (Alberta Agriculture 2000, 1). To ensure that only the best land for agriculture is used, only land classified as suitable for irrigation is granted license to draw water for this purpose. Alberta's weather also allows irrigation to flourish in the province:

> Precipitation can provide up to 50% or total crop water needs. Alberta's continental climate reduces irrigation water requirements compared to hotter climates with longer growing seasons. Our short irrigation season allows soils to drain during the long winter months, reducing the risk of soil-salinization and water logging. (Alberta Agriculture 2000, 3)

Thus, Alberta's irrigation industry should continue to take advantage of the productive capacity of Alberta's environment.

Alberta's environment allows irrigated agriculture to be highly productive. Although irrigation places high demands on water supplies it produces a high rate of return. Alberta Agriculture reports, "Irrigated agriculture in Alberta provides about 16% of total agricultural production from about 4% of our agricultural land"(2000, 1). In fact irrigation provides a diverse array of benefits to Alberta, making the water inputs invested in it well worthwhile. As the productivity of irrigated land is so high, it provides other sectors such as the cattle industry and the value added food industry a reliable source of products (Alberta Agriculture 2000, 1). As the Alberta Irrigation Projects Association Asserts, "irrigation allows producers to grow high-value and specialty crops - [such as] sugar beets, livestock, potatoes, sunflowers, herbs and vegetables – targeted for the secondary agricultural food industry"(---). This draws companies like McCain among many others to Southern Alberta, creating jobs for the area"(AIPA). The AIPA reports, "a full 30% of employment in Southern Alberta is linked to irrigation"(). The job market for Albertans thereby depends on the availability of water for irrigation agriculture.

The relationship between irrigation agriculture and the larger community provides further reason to dismiss the conception of water distribution as being a competitive enterprise. Through their 1993 Irrigation Impact Study the AIPA found that "irrigation supplies 48 communities with water for domestic use"(). These communities make up 43% of rural Alberta's population. The study also discovered that irrigation feeds into about 80 bodies of water composed of canals reservoirs and sloughs. Irrigated wetlands, especially, provide much-needed habitat for threatened and endangered species. The requirements of irrigation need not be in conflict with domestic and ecological demands on the water supply.

Regrettably, some recent events have leant credence to the competition model of water distribution. The Farm Gateway reports that drought or near drought conditions faced by farmers in Southern Alberta over the last two years have lead to the rationing of irrigation water sometimes to levels reaching " . . . only half of what is needed to grow a healthy crop"(2001, 4). A group of rural and urban residents from Central Alberta called the Butte Action Committee (BAC) reports that at the same time about 43 billion gallons[5] of drinkable groundwater has been pumped underground into oilfield water floods, an amount exceeding what "Edmonton, Calgary and Red Deer cumulatively use in a given year"("Industrial water" 2001). This has led some to question where the priorities of the government are in allowing the energy sector to use so much water while irrigators are facing shortages ("Industrial water" 2001). While oil companies can use other substances for floods, there is no substitute for water in the irrigation industry (Melchoir 2001, 5). Members of the BAC do not blame the oil companies for choosing the cheapest substance to use in their operations, but the government for allowing them to do so. The future of irrigation agriculture depends on the ability of the government to appreciate the benefits Alberta receives from this industry and allot water accordingly.

Changes in the way water is to be used and allocated need to be made if the irrigated agriculture is to expand to meet the desires of the Alberta government to increase the food-manufacturing sector. The Canadian government reports, "at present, most of Alberta's 13 irrigation districts are at or near their area limit"(Coote and Gregorich 2000, 132). This means that opportunities of expansion are limited.

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[5] Ernie Hui, head of Alberta Environment's water management division estimates that amount of water allotted for industrial use by the government in closer to 38 or 39 billion gallons **(Melchoir 2001.)**.

A further problem facing the irrigation community is that at the same time that it should be trying to conserve water, it should be using more for its existing operations. Alberta Agriculture asserts, "it has been generally accepted that on-farm irrigation water applications have been significantly less than the amount required for optimum production and less than current water allocation licenses"(1998, 1) Farmers should be using more of the water allotted to them for the crops they are currently growing. The amount of water that is used varies from year to year. In hot, dry years 84 to 88% of water allocated under licenses is used. In wet years much less is used. The lowest amount used was 40% in 1993 (Coote and Gregorich 2000, 18). Whether in wet or dry years, Alberta Agriculture found that "on average, the crops monitored used 52mm less water than required"(1998, 1). The study on irrigation concluded that some farms had irrigation systems inadequate for their needs, which accounted for 12% of the under-irrigation while the key factor was operator error, which accounted for 88% of under-irrigation (1998, 2). These problems lead to 55% percent of the fields studied to be under-irrigated at least once during the season. There is, nonetheless a problem of over-irrigation, which occurred on 23% of the fields. The way that the irrigation system was designed resulted in 34% of the tested fields to be over irrigated. Mistakes by the operator accounted for 69% of over-irrigation (Alberta Agriculture. The numbers show that even if the number of fields that were over irrigated were eliminated, the amount of water saved would not make up for the amount of water needed to provide adequate moisture for the crops that are under-irrigated.

Thus, at the same time as irrigated agriculture should expand and use more water on its existing crops, it must also conserve. This is a complex problem that producers are facing. Many have already made improvements to their operations, but more will have to be done to bring the seemingly conflicting desires of economic development and water conservation together.

Improving Irrigation Efficiency

In order to address some of these problems, over the years irrigators, in cooperation with government and researchers have introduced efficiencies into irrigation systems. As reducing the amount of water given to plants is not a viable options, conservation plans center on reducing the amount of water that can be wasted in the irrigation process.

The most common method of reducing waste is to improve the irrigation equipment. For example, "irrigation head works, main canals and whole distribution systems have been renovated to prevent water loss." In addition irrigators have begun to "switch from less efficient gravity systems to more efficient sprinkler systems or highly efficient drip or trickle systems. In 1970 only 20% used sprinkler systems but by 1994 this number had increased to 63% (Coote and Gregorich 17). Nonetheless, changing the irrigation systems is a large expense which not all irrigators can afford to do.

As stated earlier, Alberta has good soil and weather conditions for irrigation. However, this does not mean that all land is suitable for irrigation. One way to further reduce the amount of water used is to stop irrigating land that is too dry or does not have the right nutrients and texture. The government of Canada reports, "some irrigators are converting saline land back to dry land"(Coote and Gregorich 2000, 17). It may make even more economic sense for producers to stop irrigating land that has low returns than to waste precious time, money and, of course, water on such fields.

To further reduce the impact of irrigation on water supplies irrigators have begun to use treated municipal effluent as a source of water. It is estimated that effluent is used for about 65 projects irrigating a total of 5700 hectares. Agriculture and Agrifoods Canada asserts that the project could be expanded to irrigate a further 115 000 hectares. Not only would expansion reduce the demands for water but would also "reduce or eliminate undesirable discharge into natural waterways." Therefore the department concludes that 'effluent irrigation is sustainable provided that projects are properly designed and managed to protect soil and water quality"(qtd. in Coot and Gregorich 2000, 20). Representatives of the Saskatchewan irrigation Diversification Centre do warn: "Effluent irrigation to promote economic development should be considered only where long-term sustainability of the site is possible and appropriate monitoring measures are incorporated to measure changes in the ecosystem. Effluent irrigation for the purpose of disposal is generally considered the least environmentally damaging solution to a municipal disposal problem. Sustainability in these cases might be viewed as sustainability of the environment at large as opposed to sustainability of the disposal site"(qtd. Coote and Gregorich 2000, 20).

To balance the benefits of irrigation with the cost to the public in terms of depletion of water resources Agricultural Economist Ariel Dinar and soil physicist John Letey assert that a crop-water production model should be used to develop water management policies. The model "should allow policy-related problems such as pricing of irrigation water, taxes on agricultural pollution and subsidies to enhance technology adoption to be addressed"(1996,17-18). Such a model would allow the impact of policies to be more easily analyzed and would allow the benefits and costs of public and private interests to be evened out. Dinar and Letey have developed two such models based on economic and agricultural principles that policy makers should refer to in doing research and making decisions. It is necessary not only for the government to understand the costs and benefits of irrigation, but also for the general public to see that the allocation of water to irrigation as well as the subsidies given to farmers to maintain this practice is fair and the return on investment high.

The government of Alberta does seem to have an optimistic outlook for the future of irrigated agriculture in Alberta, despite the problems that the industry is facing. Alberta Agriculture, Food and Rural Development predicts, "With continued good management and responsible stewardship, irrigated agriculture in Alberta should be sustainable"(200,1). The department defines sustainable irrigated agriculture as "... the ability to produce adequate food from irrigation farming practices indefinitely, without harming soil and water resources or the environment"(Alberta Agriculture 2000, 1). However to ensure that irrigated agriculture is sustainable indefinitely it is up to the government along with all water users to ensure that water is used wisely not just by the irrigation industry but by other major consumers as well.

Conclusion

Canadians should not become complacent about the availability of water. We must ensure that supply and demand meet not just by increasing the sources of water but also by decreasing inefficient use of water. Maintaining the quantity of water includes the need to ensure that water is not exported to other countries. This issue will be discussed in the next chapter.

Chapter 3: Export

As organizations such as the UN and the World Bank add to mounting predictions that most of the world will be short of water within the next few decades, much of a thirsty world will turn to Canada and its relatively abundant supply.[6] Canadians can expect that pressure will be mounting from foreign and domestic interests to export our water. But what impacts would exporting water have on Canada as whole and Alberta? Where does Canada currently stand on water export? And, where should it stand? What obligations, if any, does Canada have to export water under international trade Agreements?

The first thing to establish is what the export of water refers to. A great deal of confusion and debate surrounds the issue of bulk water export. The Canadian Government defines bulk water export in terms of " . . . large scale removals of water by man-made diversion, such as canals, tanker ships or trucks or pipelines" that are destined for the international market (Environment Canada 2001, 1). Currently such practices do not occur in Canada. There is a certain amount of small-scale removal, which includes activities such as the bottling and selling of water to domestic or international markets (Environment Canada 2001, 1). Small-scale exports are not the focus of the controversy although they do have a background role to play in large-scale export considerations.

Concerns

Currently most forms of bulk water removal are prohibited not just for international export but also for inter-provincial trade due to environmental concerns. For example Nova Scotia's Institute of Oceanography warns that if skim off proposals are implemented such as the one for Gisborne Lake (which will be discussed below), they would lead to massive reductions in freshwater discharge which would " . . . alter, and in some cases destroy, the existing ecosystems in the adjacent coastal region"(qtd. in Bowman and O'Malley 2001). The fact that the economy around Gisborne Lake has been depleted due to the disappearance of Cod should demonstrate the dangers involved in relying too heavily on a supposedly renewable resource.

As discussed in a previous chapter, water quality is a major concern to Canadians. While some argue that exporting water would provide Canada with the money to upgrade our water systems, others assert that it would make the problem of water quality worse. The Canadian Environmental Law Association (CELA) points out that "lower water levels will mean greater disturbance of highly contaminated sediments in shallow harbors and connecting channels and less dilution of polluted waters"(qtd. in Bowman and O'Malley 2001). Consequently, instead of facilitating the development of our water systems, water export will simply add to existing problems.

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[6] The UN predicts that by the year 2025, two thirds of the world will be water Poor (Bowman & O'Malley, 2001).

Rather than making plans to export our water, Canadian citizens along with municipal, provincial and federal governments should be focusing on ways to better manage the quality of our water. Contamination in Walkerton and North Battleford shows that checks and balances in our system are not working. If we cannot even guarantee that our own communities have fresh water how will we be able to develop an infrastructure for export that ensures water exports carried out in a proper fashion? The amount of money that would have to be spent for the government to keep check on the amount of water that is exported and the methods by which it is done could prove to be prohibitive once this expense is added to the cost of transporting water. Marq de Viliers, winner of the Governor General's Award for non-fiction for his book. *Water*, calculates "the cost of collecting and shipping Canadian water to distant markets would be . . . far more expensive than drinkable water recovered by new-generation of desalination plants"(Bowman and O'Malley 2001). It is, therefore, questionable as to how much profit can be made by exporting water.

These profits would likely be further offset by losses incurred to domestic industry. The agricultural industry, in particular, would be extremely vulnerable. The sensitivity of the industry to fluctuations in the quantity of water was seen this year as many farmers sold off livestock due to the drought conditions. The irrigation sector, in Alberta, as reported earlier, is near capacity under the current water infrastructure. Farming community cannot afford to loose supplies of water at this stage. In fact, on the prairies conservation projects are going to have to be intensified. Still, it makes more sense to develop agriculture in Alberta and in the rest of the prairies than to divert water to place like California, which carry out such unsustainable practices farming on deserts (Muldoon 2000, 2). In addition, the economy of Alberta is dependent on the Agricultural community as a source of revenue, employment and diversification. To put the agricultural industry in jeopardy is to undermine the entire economy.

It is not even evident that they export of water would bring long-term benefits to foreign destinations. As mentioned the cost of exports makes the venture questionable.[7] A CELA paper concludes:

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[7] The exception may be the United States, which is close enough to vastly reduce the cost of export. However many would argue that they should and could improve water management in

> Even large-scale water exports cannot possibly satisfy the social and economic needs of distant societies. Water shipped half way around the world will only be affordable to the privileged and will deepen inequalities between rich and poor. International trade in bulk water will allow elites to assure the quality of their own water supplies, while permitting them to ignore the pollution of their local waters and the waste of their water management systems. (qtd. in Bowman and O'Malley)

The world may be facing a water crisis, but export of water from Canada is not the best solution.

Even with the environmental and economic drawbacks to exporting water there are still people who wish to do so. Unfortunately regulations that prevent most forms of bulk water removal are likely not strong enough to prevent bulk water export. Governments must make a substantial effort to ensure our water is not stiffened off at the whim of the international market place.

Government Policy

In the past most issues that Canada had with water on an international level were in relation to the United States. In 1909 the International Boundary Waters Treaty (IBWT) established 30 international boards " . . . with equal representation from each country to manage cross-boundary rivers and water bodies"(Coote and Gregorich 2000, 14). In February of 2001 the federal government reintroduced amendments to the IBWT which would " . . . prohibit bulk removal from Canadian portions of the boundary waters . . ."(Environment Canada 2001, 3). The government does not, however, state whether these amendments have been accepted and put into practice.

In fact, the federal governments policy on bulk water export is entirely unclear. An Environment Canada publication entitled "Bulk Water Removals and Water Export: Frequently Asked Questions", states that its stance on export is held within a three-part strategy "designed to prohibit the bulk removal of water – whether for domestic purposes or for export (2001, 4). Yet, nowhere in this document is the three-part strategy outlined. The amendment introduced to the to the IBTW was the only mention of federal legislation that would prohibit the export of water.

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order to meet their needs. For example, restrictions could be placed on swimming pools, and California could stop trying to grow Cotton, which is not suited to the environment. Some

Additionally, in *The Health of Our Water*, produced by the government of Canada, the authors state, "It is still unclear whether bulk or flowing water exports are permitted under existing legislation (Coote and Gregorich 2000, 25).

Doubt over the federal government's stance on water export is furthered a recent request on the part of Environment Canada for bids on a contract to develop a measurement of the value of Canadian water. Environment Minister, David Anderson, claims that this is not part of a plan to export water. It is instead, he claims, " . . . a way to determine the value of a resource that is sometimes taken for granted"(CBC 2001, 1). He asserts that if people understood how much water is worth they would be more willing to invest in its protection (CBC 2001, 1). Nonetheless, critics from both sides of the political spectrum question the motives behind the valuing of water. Alexa McDonough, leader of the NDP asserts, "they're putting a price tag on our water, so when they decide to export they'll be ready"(CBC 2001, 1). From Alberta, Ralph Klein also condemned the move as a step towards exporting water, something he adamantly opposes ("Oil and Water" 2001,1).

Suspicions that the government may be planning to export water are spurred on by comments one Liberal MP made in April. CBC reports that the MP " . . . announced that the government was forming a parliamentary committee to look at bulk water exports"(2001, 2). Although the party whip denied the claim, lingering doubts remain.

These doubts will likely be expressed in hearings this September that the federal government is planning. The government is creating an all-party House of Commons committee that will hold hearings on freshwater security. The proceedings will include an examination of bulk water export issues, among others (Bowman and O'Malley 2001). Liberal MP Dennis Mills, who will chair the committee, has tried to establish himself as an opponent of water export. "There are some Canadians who even talk about diversion" he states, "Now all of these people frighten the hell out of me, but what we have to do is bring this debate to the light of day"(qtd. in Bowman and O'Malley 2001). Still, it is unlikely that the fears of many Canadians that the Liberal government is planning to export water will be allayed until the government sets down strong legislation prohibiting bulk water export.

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farmers in Alberta, as reported in the previous chapter have stopped farming on land that is not suited for crop production. Farmers elsewhere should follow these Albertan's lead.

Even some provincial premiers are calling for the federal government to take such action. Ralph Klein, for example, thinks that it is up to the federal government to close the border to any bulk water shipments by legislating a ban on exports at the national level ("Oil and Water" 2001, 1). Klein along with the four western premiers wrote a communiqué stating that they " firmly opposed the bulk removal of water for export and any transfers of bulk water across provincial-territorial and/or international borders"("Oil and Water" 2001, 1). As the federal government has jurisdiction over trade, it is logical that a ban on bulk water export should be implemented federally.

On a provincial level, most of the provinces have taken some steps towards prohibiting the export of water from within their borders (Environment Canada 2001, 2). Alberta's Water Act provides that no licenses will be granted to transfer water out of Alberta. Section 46 of the Act states:

> For the purpose of promoting the conservation and management of water, including the wise allocation and use of water, a license shall not be issued for the purpose of transferring water form the Province outside of the Canada by any means, unless the license is specifically authorized by a special Act of the Legislature.

This is tempered by a further note that the provision " . . . does not apply to processed water and municipal water." In reality this does little to prevent the export of water from Alberta.

The Act does not reflect recommendations by the Water Management Review Committee (WMRC) to enact stronger provisions against water export. A draft of the Act was released for the WMRC to put to the public and make recommendations based on citizens' response. The WMRC thought that the requirement for a 'Special Act of the Legislature" was an inadequate way of changing the "no export of water quality" specification. The group unanimously recommended that a public review be made mandatory for any alterations to the policy. These recommendations were ignored. There was also some concern among the public about the exemption of municipal and treated water. Moreover, the WMRC recommended that the provisions be " . . . reviewed to ensure that they are restrictive enough to prevent any export of water under the North American Free Trade Agreement"(1-2). This legislation clearly does not does not do so but leaves huge loopholes in the prohibition of water export. The provincial government would likely defend itself by placing the onus on the federal government. But until such time as a ban is placed on exports at a national level, provinces should take responsibility for protecting this resource.

Some provinces are taking their own initiatives to prevent bulk water export. Premiers of Quebec and Ontario along with eight U.S. governors signed a water accord regarding the Great Lakes. The National Post reports that "the four page document is a blue –print for ensuring " . . .water will not be diverted in bulk form from the 5 lakes without consensus among the 10 provincial and state governments"(Benzie 2001). The accord is the first step towards a final treaty set to be completed and approved by the respective national governments in 2004. Ontario was central to preventing exemptions that states like Ohio and Wisconsin wished for (Benzie 2001). US governors whose states border the great lakes shared Ontario and Quebec's concern that water not be diverted to the Southern states. These northern states may be a key ally in offsetting pressure by the southern United States to export water.

Whether they have made a constructive effort to ban bulk water export or not, most provinces appear to be against the sale of water, except for Newfoundland. Premier John Grimes plans to damn any Federal attempt to prevent the export of water from his province. The newly elected premier has voiced his support for entrepreneur Gerry White who wants to ship water in bulk to international markets from Gisborne Lake in Newfoundland (Bowman and O'Malley 2001). Earlier attempts by White to skim off water from the lake have been blocked by environmentalists who have effectively argued that once water is sold from Gisborne Lake it will become a "commodity" and subject to the conditions of international trade agreements such as the General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement (NAFTA) (Bowman and O'Malley 2001). Grimes and White do not worry about such issues. They feel that exporting water will create much-needed jobs for a region whose once thriving cod industry was been destroyed when the cod disappeared. In and interview with the Toronto Star Grimes complained "the water is just running into the Atlantic Ocean, no one is getting on nickel out of it . . .. It just seems like other parts of Canada want to keep Newfoundland down"(qtd. in Bowman and O'Malley 2001).

On the contrary, the objections to exporting water that the rest of the country voice do not stem from a desire to bloc economic development in Newfoundland, but from serious concerns about the environmental, economic and trade implications of exporting this resource.

Trade Agreements

There is a complex debate in Canada as to how the international trade agreements that Canada has signed effect our sovereignty over water. How water is dealt with in international trade agreements is serious as international trade regulations have priority over national laws. This means that if a Canadian law, regulation or action contradicts provisions of any of the international trade agreements that its has signed Canada can face fines dealt out by international courts. International economic laws have more teeth than any other international laws such as companies and other countries are all to willing to take violators to court and make sure they pay for their misdeeds.

The Canadian government seems to be satisfied that the North American Free Trade Agreement protects Canada's rights to control its water. Environment Canada claims, "Nothing in NAFTA or in any of Canada's international trade agreements prevents us from protecting our water"(2001, 5). In its reading of international agreements the Canadian government takes the stance that " . . .water in its natural state – in a lake or a river, for example – is not a tradable good or product (ie. exportable commodity) and is therefore, not subject to the provisions of the these agreements"(Environment Canada 2001, 4). In an attempt to further allay fears that water may become a commodity under the terms of NAFTA the Canadian government recounts that in 1993 it made a declaration with the United States and Mexico that NAFTA does not create ". . . rights to natural water resources of any of the countries"(Environment Canada 2001, 4). It is questionable, however, whether such a declaration would hold up in court if it were found that the actual text of the treaty does provide countries access to each other's water resources.

In addition, assertions made by the Canadian government are contradicted by a number of sources. In the Witness documentary *Captured Rain: American Thirst, Canadian Water* "environmentalists, agronomists, trade lawyers and negotiators" were interviewed, all of whom agreed that the export of water falls under the terms of NAFTA. It is not just Canadians who make such a claim. Former US Senator Paul Simon, who lectures on the world's water crisis, believes that provisions of the NAFTA agreement do make Canadian water a tradable commodity. Witness discovered that "Under the terms of the GATT, bulk water is defined as a "commodity" and all the GATT definitions of "commodities for sale" were imported word for word into the North American Free Trade Agreement"(2001). Despite government claims to the opposite, most exports appear to agree that Canadian water is not protected under the terms of international trade agreements that Canada has signed.

A deciding judgment in this debate may come from the courts. Canada is already facing a lawsuit in regards to the export of water under the North American Free Trade Agreement. Jack Lindsay from Santa Barbara California filed the suite. In the early 90s Lindsay signed a contract with Snowcaps Waters, a water bottling company on Vancouver Island, which has a license to remove water from a glacial creek in Toba Inlet. Just after the contract was signed the CBC reports, "the British Columbian government killed to deal by imposing what they called a "temporary, moratorium on the export of bulk water by marine transport system"(2001,). Both parties to the deal responded to the moratorium by filing laws suits, claiming breach of contract. The BC government settled out of court with Snow Cap, but did not do so with Lindsay. The ruling on Lindsay's case remains outstanding. When handed down it could determine whether water in Bulk form is a "tradable commodity" (CBC 2001 captured rain). This would mean that once Canada allowed one company to export water, they would have to allow all companies that fall within the jurisdiction of NAFTA to do so.

Even if the ruling comes down that bulk water is a tradable commodity, there are provisions within the terms of NAFTA. Article 2101, General exceptions provides that so long as such measures are not adopted in an "unfair" or "arbitrary" manner measures can be put in place to "protect human, animal or plant life or health" or conserve "living or non-living exhaustible natural resources"() If Canada plays its cards right it could safeguard its water resources under this provision. Paul Muldoon, Executive Director of CELA explains:

> Canada could rely on [this] exception in the trade regime and ban water exports by basing its actions on well-supported evidence that such measures were needed to protect human and environmental health and conserve the resource. A national conservation strategy would not only serve the purpose of protecting our future water supply but also provide a foundation for Canada to assert its sovereignty over its own resources and withstand any trade challenges wich come our way. (2001,2)

It is ironic that Canada must reduce its use of water in order to protect its sovereignty over it. It is only if Canada treats water as a precious resource

There is a further twist in the great water debate. In an address to the symposium on International and Transboundary Water Resources Issues, Frank Quinn, head of social Impacts for the Inland Waters Directorate of Environment Canada, stated that water resources might be implicated indirectly in the free trade agreement through its use in generating electricity (1990, 383). Canada is a world leader in the production of hydroelectricity and the export of electricity in general (Quinn 1990 389). Due to this development much of the free flowing water in Canada is under the control of provincial hydro commissions. Many of these provinces, instead of planning to make money off of export of water, plan to further develop their hydro capacities in order to export electricity. This would, Quinn Argues, "... have the effect of tying up northern water systems for long periods in advance of domestic needs and in spite of abundant evidence of environmental and social disruptions caused by existing hydroelectric development"(1990, 383). In Alberta, 63% of the capacity of damns went towards hydroelectricity as compared to the national average, which was 95% as of 1990. Much of the water damned currently goes towards irrigation. However, if the province decided to increase the amount of electricity it exports the amount of water available from damns for irrigation could be severely restricted. In the fight to preserve the integrity of Canada's water the implications of exporting electricity must not be ignored, while focusing solely on the export of water.

Conclusion

Canada will have to take a multifaceted approach to preventing its water resources from becoming a tradable item at the expense of domestic interests. In the future, more time must be taken to clarify the rights of Canada and other countries to prohibit water exports. This issue should not be left for national and international courts to decide. In the mean time, the provincial and federal governments need to work together to create clear nationwide rules and regulations to conserve water and prevent export. Confusion must be cleared away so that Canadians can be sure that there is solid legislation protecting their rights to water.

Conclusion

Access to sufficient amounts of high quality water is essential for the survival of the Agriculture community. The Agriculture community itself plays a fundamental part in the Alberta economy contributing $ 7.3 billion annually from primary agriculture and an additional $9.3 billion through the processing and food and beverage industry (Sustainable Management 2001, 5). To ensure that this industry prospers, the quality and quantity of water resources must be ensured well into the future.

In partnership with the government and other users of water, farmers must work to conserve and protect water resources. The process of protecting water supplies does not need to inhibit the economic development of the agricultural community. In many cases measures to preserve water quality, such as reducing pesticide and nutrient runoff have economic benefits for the producer. Reducing the demands on water may be difficult but increasing efficiency is possible. Farmers need, economic help as well as information resources to assist the further development of water management practices.

The vulnerability of the quality and quantity of water makes the export of water an unwise proposal. In addition to the negative environmental impacts that exporting water would bring, the economic benefits of such an investment are questionable. Stricter regulations must be put in place that ensures that are water resources are not drained by international markets.

In the end the preservation of water depends on the ability to understand that protecting water is possible, beneficial and absolutely necessary.

Glossary

Consume To use water in a way that does not allow it to be returned to its source (e.g. it is bound in plant or animal tissues or evaporated).

Nonpoint-source contamination Contamination of water over a large area, usually when substances run off the land surface or leach trough the soil profile.

Potable fit for drinking (Alberta Environment 1999,7).

Point-source contamination Localized contaminations of water, such as by direct discharge of polluted water into a stream or lake, or by accidental spills of pesticides and manure leakage into domestic wells.

Return Flow water from an irrigation system that is not lost through evaporation or used by plants, and which can run into streams, lakes or back to the irrigation system itself.

Turbidity Measure of water clarity, or the degree to which water is opaque due to suspended silt or organisms.

(Coote and Gregorich 2000, 151)

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#1397

A Discussion About Climate Change

Proposed:

Proposed that the data now available indicates that human enhanced water evaporation, rather than human enhanced greenhouse effect, is the primary cause of climate changes currently being observed.

Agreed to:

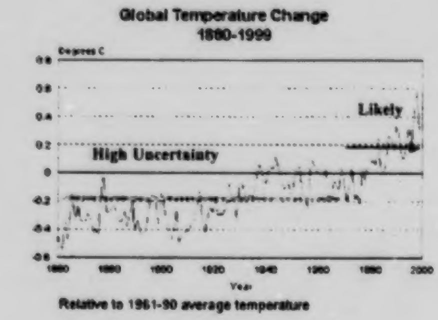
- Data collected over the last 5-10 years indicates that climate changes are occurring on at least a regional basis.
- Human activities are likely a major contributor to these changes. The consensus statement that: "the balance of evidence suggests a discernible human influence on global climate" is being confirmed.
- While change is occurring it does not appear to be global change, as many areas (southern hemisphere, tropical latitudes, and ocean areas) are showing no significant changes in temperature or climate patterns.
- While change is occurring the attribution, or reasons, for the changes observed have not been established with any certainty, and is therefore the primary source of a disruptive on-going debate, which prevents reaching agreement on appropriate responses.
- Human impacts potentially large enough to impact hemispheric, or global, climate are:
  - **Energy Use** – From sources other than natural biological processes. Result is increased CO2 and hydrocarbon emissions from fossil fuel use, and changes in geographic distribution and patterns of energy emissions in the form of light, heat and water vapour.
  - **Land Use** – Conversion of large areas of jungle, forest, prairie and desert habitat to other purposes: agricultural, industrial or urban. Result is changes in radiative properties of the land areas affected, as well as changes in the exchanges of energy, water and chemical components between large areas of the earth's land surface and the atmosphere in those regions.
  - **Water Use** – The growth of agriculture, to support food production, and industry, to support economic growth, have both caused significant diversions and redistributions of water. Result is a major change in the land to atmosphere water cycle as most of the water used is evaporated from land surfaces, mainly in the northern hemisphere.
- All three of the above impact areas are interrelated to a large degree as changes in one will impact, or are facilitated by, one or both of the others. All three areas have increased dramatically in the last 30-50 years, although not to the same degree in all regions. To determine the best methods of mitigating climate change, impacts in all three must be assessed and addressed before solid conclusions can be drawn.
- To date climate models have been based on the assumption that changes in GHG emissions are the primary cause of climate change and warming, and are adjusted to more or less match

historical trends. However, the current models do not have the resolution to simulate or predict regional climate, and do not yet include the ability to model other human caused changes in land use and water use.

Data:

This discussion is based primarily on data contained in the 2001 IPCC Technical Report on Climate Change, and conclusions concerning measured trends reported by the IPCC. This data, rather than the model results and projections drawn from it, has been adequately challenged, tested and peer reviewed by researchers outside of the IPCC group. It is based on direct measurement, with data collected over the past 20-30 years being the most reliable. The main conclusions of the 2001 IPCC report concerning the evidence for climate change are:

- **GHG Concentrations** – Carbon dioxide and methane in the atmosphere are climbing and are globally consistent so there is no major concentration difference between hemispheres.
- **Global average temperatures** - Are higher, however, the higher temperatures are predominantly seen in temperate and arctic regions. Temperature data collected prior to the 1970's has a high degree of uncertainty for a number of reasons, while more recent data has shown a distinct increase in temperature. The average increase should not be interpreted as meaning that warming has been observed everywhere. Some arctic areas are warmer by several degrees while some ocean and other locations are actually cooling and much of the earth's surface has shown no change in the past three decades.



- **Diurnal Temperature Range** – Night time low temperatures are increasing at twice the rate of day time high temperatures. This change is positively correlated with cloud cover effects, which are too small to be resolved in global climate models.
- **Growing Season** – Increasing by 1 to 4 days per decade in the northern hemisphere.
- **Amount of Precipitation** – Has increased by 5-10% over most land areas in mid to high latitudes of the northern hemisphere. However, there is no observed increase in the southern hemisphere.
- **Heavy Precipitation Events** – Have increased in northern latitudes, likely between 2 to 4% over the past 50 years.
- **Atmospheric Water Content** – Has increased in the northern hemisphere by several percent per decade, some reports indicate lower atmospheric increases of 1% per year in the northern hemisphere.
- **Cloud Cover** – Has increased by 2% in the northern hemisphere and is positively correlated with the observed decrease in diurnal temperature range.

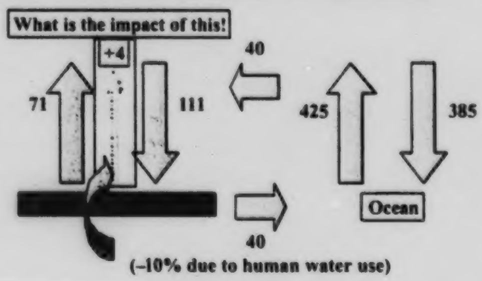
- **Sea-Ice** - In the northern hemisphere has been decreasing, however, there is no similar observed trend in Antarctic sea ice.
- **Non-polar Glaciers** – Widespread retreat at an increasing rate, except in coastal areas.
- **El Nino Events** – El Nino events are becoming more frequent, persistent and intense over the past 30 years, causing severe climate fluctuations in much of the northern hemisphere.
- **Sea Level Rise** – No acceleration in the historic rate of sea level rise has been detected over the last century. Many low-lying areas are subsiding due to non-sustainable depletion of fresh water aquifers in those regions.

Discussion Supporting the Proposal:

- Most of the data supports the conclusion that climate change is overwhelmingly a Northern Hemispheric phenomenon. Increases in temperature, water vapour in the atmosphere, cloud cover, rainfall, ice cover retreat, unusual weather events and increased severity of precipitation events and droughts have all been occurring primarily in the northern hemisphere. While mixing of atmospheric gases occurs between hemispheres, weather cycles tend to be isolated by hemisphere.
- A recent exception to the northern hemispheric bias, is the recent, March 2002, collapse of the ice shelves on the Antarctic Peninsula. However, this exception may prove the point, as the Peninsula is the part of the Antarctic continent closest to human influences as it receives air and water flow off the coasts of South America, which is less than 1000 miles from the deteriorating ice shelves. Indications are that no other point in Antarctica has shown any change in the last 150 years. Both Argentina and Chile have energy intensive industries and agricultural irrigation, and have economies similar to those in Canada.
- The largest changes in human water use have occurred in the northern hemisphere particularly in land areas where irrigated land and industry have been undergoing rapid growth over historic levels. The water use is large enough to have a significant impact on atmospheric water and energy balances. The IPCC and other scientific studies have shown that water withdrawals from fresh water sources (rivers, lakes and aquifers) for human use have reached over 4000 Gt/yr. This volume represents a 10% reduction in river outflow to the oceans and a 5% increase in land water evaporation. **This increased rate of evaporation is not due to atmospheric warming**, but is primarily due to the increased absorption of solar radiation to evaporate water from sources such as: large areas wetted by agricultural irrigation (2/3 of the water used); domestic water losses; or evaporation from open water reservoirs formed by

Global Water Cycle (km^3 x 10^3/yr = Tt/yr)

Source: Global Warming – The Complete Briefing – John Houghton

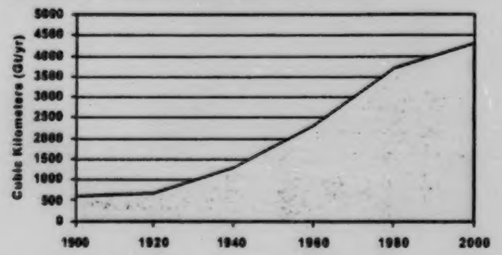


dams to support power generation and irrigation projects. Energy and water are also being dumped from nuclear plants and other industrial processes where cooling towers evaporate water to dissipate unutilized energy.

- The incremental energy required to evaporate 4000+ Gt/yr of water, is over 9000+ ExaJoules/yr if the water is only evaporated once. This is equivalent to 15-20 times the global energy output from all fossil fuel and other electrical power sources, and is likely to be much larger as water added to the atmosphere in one location may fall and be re-evaporated a number of times before returning to the ocean as coastal rainfall.

Annual Global Water Withdrawals

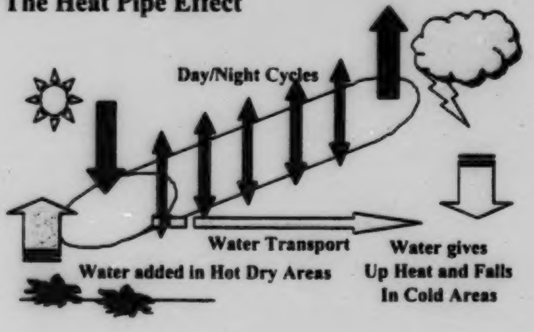
Source: Scientific American – February 2001 – Peter H. Gleick



Original Chart showed cubic miles x 4.6 to get cubic kilometers

- The increased water and energy added to the atmosphere must then come out somewhere, resulting in the transport of water and energy through what might be described as a heat pipe effect. As the atmosphere is under saturated in water, it has a high capacity to absorb additional water emitted and will carry that water until it cools to the point where it is saturated and liquid water forms. The water may form at night as dew and re-evaporate in the morning, condense and vapourize inside clouds, or fall as precipitation to intensify the local water cycle, but it must at some point leave the atmosphere as precipitation. Moist tropical air masses lose their energy and their water content over cooler regions (temperate latitudes, arctic areas, mountain snowcaps and ocean areas downwind of land masses). Wherever the water forms, energy must be released to the air to allow the water to condense. The more water that condenses the more heat energy will be liberated. The energy released will result in temperature increases in those areas receiving the precipitation, causing warming but also increasing the air's ability to retain water. The net effect is that water and energy added in hot, dry regions through irrigation, or in other regions through industrial activity, will be transported through the atmosphere to colder regions in the same hemisphere. Once condensed, the water will fall and the energy will warm the air, melt ice or increase the temperature of the water falling as rain, vs. what would be the case with natural water transport only.

The Heat Pipe Effect

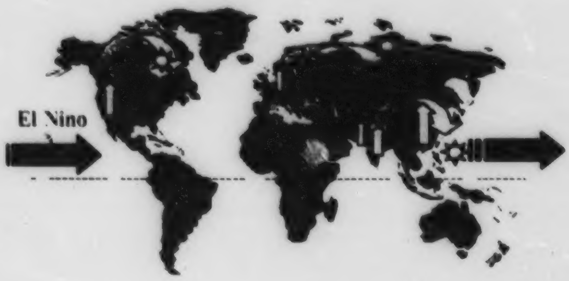


- Since the water and energy added to the atmosphere will primarily be in geographic areas that normally experience little water evaporation, the change in water emissions is more likely to generate unusual weather patterns in cooler areas receiving the moister air flow. In some mountainous regions, or areas with large bodies of water or ice, the result will be increased precipitation, increases in the rate of melting of ice masses, and/or changes in atmospheric humidity and cloud cover. Further down weather, in flat prairie areas, the result may be less rainfall, as the air is warmer than normal and can therefore better retain the water that remains in it, until it can dissipate the warmth through radiation or until it encounters colder arctic air further north or over coastal areas.

- In the source regions the evaporation of water would likely not cause ambient temperature changes, as more radiant solar energy would be absorbed by darker, wet ground, to provide the energy required for evaporation. In areas with enhanced evaporation, where there is less ability to absorb additional solar radiation, because of clouds or soils that do not darken when they are wet, cooling will occur as the energy to evaporate the water must come from a fixed or only slightly increased energy budget.

- Human Enhanced Water Evaporation better explains the general climate change effects observed in the northern hemisphere. When the geographic distribution of enhanced water evaporation is considered the impacts on global and regional climate change become even clearer. As indicated earlier most of the water withdrawals are in the northern hemisphere, but also their location with respect to movement of air masses is even more telling. **Over half of the irrigated agricultural land is located in only four countries, which are India, China, U.S. and Pakistan.** While industrial water output from nuclear power and manufacturing are in those same areas, and from European countries, which also contribute water from irrigation. These regions are the likely source of the large volumes of water and energy that are being transmitted to cooler Arctic areas, and to the Pacific Ocean. Water emitted in India, Pakistan and China likely condenses and falls just at the location where El Nino begins, driven by warming of surface waters.

Feeding El Nino & Arctic Warming?



- On a more regional level, similar effects can be observed. In Western Canada, the Fraser River Valley and Okanagan Valley areas in southcentral and southwestern British Columbia are similar to southern California in being warm and dry, but ideal for growing fruit and other crops with the application of irrigation. These valleys have turned from dry desert like conditions to green fields and orchards over the past 30-40 years. During the hottest times of the year water sprays on to fruit orchards and fields on an almost continual basis. Just to the east of these areas are Canada's Columbia Icefields and Glacier parks, which have been melting and retreating at ever increasing rates in recent years. Air currents, flowing from the irrigated areas, move over the ice sheets before reaching the Canadian prairies, which are experiencing warmer temperatures and higher humidity, but less precipitation. This interaction between irrigation in the B.C. valleys, meltdown of the glaciers in national parks, and reduced rainfall on the prairies might be an area where the theory of human enhanced water evaporation could be tested to see if the changes in these three areas are directly linked. A similar effect, with fewer variables, might be studied in the Antarctic Peninsula, which would be less impacted by El Nino events and should be most affected by water emissions from smaller regions of one country, Argentina.

Feeding Energy to Melt the Glaciers & Warm/Dry Out the Prairies?

Yukon
Northwest Territories
Alberta
Pacific Ocean

Discussion Against Alternate Proposals:

- **The Greenhouse Effect** – The greenhouse effect does exist and directionally changes in the composition of the atmosphere will impact the radiative balance. The issue is whether or not the low concentrations of GHG's in the atmosphere could be wholly responsible for the climate change effects observed. We feel the evidence does not support this being the most significant effect since:
    - The greenhouse effect is global in distribution. As the changes in GHG concentrations in the atmosphere have been measured and shown to be consistently increasing worldwide the effects of warming should also be worldwide. Yet many areas (southern hemisphere, oceans, tropical latitudes, and isolated regions e.g. the state of Wyoming in the U.S.) are not yet showing discernable changes in climate or temperature.
    - The greenhouse effect is radiative in nature. Radiative balances based on changes in GHG concentrations should result in larger impacts where the radiation is the most intense and prolonged. I.e. tropical areas rather than temperate or arctic areas where the warming and climate changes are actually being observed.
    - The greenhouse effect does impact the natural water cycle, and at least half of the impacts indicated by modeling are due to estimations of GHG enhanced water cycle effects.

However, the impacts should be seen in areas where the most area of water is exposed to the radiative heating and with the highest ability to absorb the radiation, which are the ocean areas. This should result in larger changes being observed in the southern hemisphere which has the largest area of ocean surface, but no impacts of this can yet be seen in the data.

- **Land Use Changes Causing Climate Change** – Land use, aside from the energy and water effects, mainly impacts the amount of solar radiation absorbed, by changing the surface composition.
  - Desertification, draining of wetlands, monoculture cropping and clearing of forests or jungles for logging or agricultural uses would tend to increase the amount of solar energy reflected.
  - Irrigation or "greening" of dry areas, urbanization of large areas and large expanses of pavement increase the amount of energy absorbed, which must then be reradiated at night.
  - Land use induced changes are likely occurring but will mainly be a local effect since the areas impacted are small compared to the total surface of the earth, and radiative energy cannot be transported over long distances without a carrier medium such as water vapour.

Proposed Methods of Testing the Proposal:

- Human Enhanced Water Evaporation is happening and appears to have the potential to impact climate in the ways that have been observed. However, this theory requires review through additional scientific assessment and testing, with input from scientists from many disciplines. Proposed methods of testing the theory:
  - Conduct more detailed cause and effect studies on a smaller than global scale, in isolated regions such as western Canada, or the region including the lower portions of South America and the Antarctic Peninsula. Studies should consider water emission changes, weather patterns, and changing trends in ice-shelf or glacial degradation measured in the recent past and in the next 5-10 years.
  - Include human enhanced water evaporation in regional climate models and models studying El Nino on a priority basis to model the effects.
  - Researchers have indicated that water might have played a greater part in past climate changes and these studies should be expanded and not restricted to radiative effects, but should also consider changes in water distribution changes on land surfaces.

Implications if the Proposal is Tested and Verified:

- If the proposal is tested and verified the implications are that many of the proposed responses to climate change are inappropriate and may only lead to accelerated climate change. Options such as increased use of irrigation to produce biomass energy, increased use of nuclear energy which uses large amounts of evaporative cooling, north south water transfers to overcome effects of drought, and construction of dams to produce hydroelectric power should not be considered as climate change mitigation options.

- The response to climate change would have to change from a focus on simply reducing GHG emissions by changing energy sources, to one of continuing to reduce energy, land and water intensity in all agricultural and industrial activities.
- In agriculture more effort should be placed on reducing water use in irrigation practices by changing the irrigation methods, or by changing the crops grown to better suit the natural water precipitation available in a given area. E.g. fewer orchards in dry areas and more production of grapes and fruit or vegetables that prefer lots of sun and less water.
- In industry, greater efforts should be directed towards reducing energy wasted through the dumping of energy in the form of heat or water to the atmosphere. Processes exist to turn low quality energy streams into power, and these processes should be integrated into most power generation and process operations to reduce the amount of energy that is unutilized. Where the heat energy must be dumped it should be emitted through aerial cooling or hybrid systems, where as much as possible of the heat is radiated rather than converted to water vapour. Many of these options will be economically attractive by either generating a new revenue stream, from power sales or displacement of power purchases, or by lowering the cost of equipment required to dump unutilized energy.

Comment on Climate Change vs. Sustainability:

- **Need to Reduce All Waste** - While this discussion has focused on changing the current perceptions concerning the immediate and most pressing source of climate change, this does not mean that other forms of waste can be ignored. Human waste of water appears to be the root cause of current and future hardship for the populations and ecologies affected by climate change. Wasteful land use practices are a current and growing hardship for biodiversity and a healthy and robust environment. The waste of concentrated and easy to access fossil fuel energy sources will cause hardships for future generations who will have to cope with the loss of these valuable resources.
- **Greenhouse Effect and GHG Emission Reduction** - There is no reason to challenge the theory that, over the longer term, a human enhanced greenhouse effect might not also be demonstrated or that the on-going waste of land, energy and mineral resources are not, or will not, cause future hardship for humanity and the environment. The efforts to reduce greenhouse gas emissions are really efforts to reduce energy waste, and GHG emissions can be used as indicators of the level of waste (energy used and hydrocarbons emitted without being utilized) that is occurring.

"There is more to life than increasing its speed." - Mahatma Ghandi

#1021

34. Canadian Ground Water Association

Shock Chlorination

A procedure known as Shock Chlorination is a method to treat water wells for iron and sulfate reducing bacteria.

- In shock chlorination calcium hypochlorite is recommended rather than bleach because the chlorine content ranges from 65 to 70 percent. Table 3 illustrates the quantities to be used.

Procedure

1. Store enough water for 12 hours
2. Bypass any carbon filters in the system
3. Measure the column of water in the well
4. Calculate from Table 3 the amount of water needed for chlorination. Eg. a 245 ft. well, 8" diameter with a static level of 45' has a column of water 200 ft.. The volume of water in the well would be 2x435 or 870 gallons of water
5. Calculate the amount of chlorine required and mix it with the water, eg. 870 gals. of water should be mixed with 44 oz. of chlorine
6. Pour the solution into the well and load up the distribution system by running each fixture until the chlorine odor is detected
7. Let stand in the well at least 8 hours
8. Pump to waste until no chlorine odor is detected

**NOTICE TO READERS:
ASSUMPTION OF RISK
AND EXCLUSION OF LIABILITY**

The procedures & products are dangerous. Improper sanitization of a well can cause serious illness or death

The Canadian Groundwater Association & Red Deer College hereby disclaim any liability or responsibility for any injury or damage resulting from the use of information contained herein

TABLE 3

Amount of Chlorine Required to Obtain a Chlorine Concentration of 200* PPM in a 100 ft. Column of Water

CASING DIAMETER	VOLUME OF WATER Needed (per 100 Ft of Casing)		CALCIUM HYPOCHLORITE 65% AVAILABLE CHLORINE (Dry Weight**)	
(INCHES)	IMPERIAL (Gallons)	METRIC (Litres)	IMPERIAL (Ounces)	METRIC (Grams)
2	25	125	1.5	40
4	110	500	6	150
6	245	1100	12	350
8	435	2000	22	600
10	680	3000	34	950
12	1000	4500	50	1400 (1.4 kg)
16	1750	7900	85	2500 (2.5 kg)
18	2200	10000	110 (7 lbs)	3000 (3.0 kg)
20	2700	12500	135 (8 lbs)	3800 (3.8 kg)
24	3900	18000	195 (12 lbs)	5500 (5.5 kg)

ACKNOWLEDGEMENTS: Alberta Water Well Drilling Association

CGWA

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Phone: 403-749-2331
Fax: 403-749-2958
E-mail: cgwa@agt.net

RDC

Apprenticeship and Industrial Training
Box 5005, Red Deer AB T4N 5H5 Canada
Phone:
403-342-3456
Fax:
403-342-3366

Guidelines for Sanitizing a Water Wel

Written by CGWA and prod
part by Red Deer Colle

General Guidelines and Information

1. Disinfection or sanitization of any well will only kill the bacteria present in the well or on the pumping equipment.
2. Every well after construction or repair should be sanitized.
3. Bacterial contamination can also occur if at any time vermin or surface water has entered the well.
4. Some bacteria is harmful to man while other bacteria may not be a health hazard but can be a nuisance to well production, staining and plugging distribution systems.

Procedure

1. The quantity of chlorine compounds used for sanitizing a well shall be sufficient to produce 250 mg/l (ppm) of chlorine solution when mixed with the total volume of water retained within the well Refer to Tables 1 & 2.
2. Well without pump - using liquid chlorine: measure the diameter of the well and calculate the volume of chlorine bleach (5.25% active chlorine) required using Table 1. Take the volume of chlorine bleach determined from the table and mix this in at least 45 litres (10 gals) of water. Pour this solution into the well and let it stay in the well for at least 12 hours. Pump the well for at least one hour to remove the chlorine solution.
3. Well with pump – using liquid chlorine: measure the diameter of the well and calculate the volume of chlorine bleach (5.25 % active chlorine) required using Table 1. Take the volume of chlorine bleach determined from the Table and mix this in at least 45 litres (10 gals) of water.
   - Pour this solution into the well between the drop pipe and the well casing. If the [illegible] has a sanitary well seal this may be done by pouring or siphoning it through the air vent or by removing the well seal entirely. If the casing has a vermin proof water-tight cap remove the well cap and pour the solution directly into the well.
   - Wait 15 minutes then open all faucets in the distribution system and let the water run until the chlorine odor is detected. Turn the water off (and the pump off) and add a second volume of chlorine bleach (the same amount as initially added). Seal the top of the well
   - Let the system sit idle for 12 hours
   - Discharge the water from all outlets until chlorine odor and taste have disappeared
   - Faucets and outlets on fixtures discharging to septic tank systems should be temporarily diverted to an outside discharge point to avoid having the chlorine solution enter the septic system
4. Sanitization with chlorine tablets or powder:
   - Chlorine tablets normally contain about 65% to 70% available chlorine present in calcium hypochlorite
   - Since these tablets can cause "burns" safety precautions in handling should be taken
   - Measure the diameter of the well and calculate the weight of the tablets required per 30 metres (100 feet) of water using Table 2 (250 mg/l (ppm) solution)
   - Dissolve the required weight of tablets in warm water. Pour the solution into the well by removing the well seal or cap
   - Wait 15 minutes after pouring the solution into the well and then follow the same procedure by running all faucets or outlets until a chlorine odor is detected at each outlet
   - Close all taps, shut off the pump and leave the solution in the well for 12 hours
   - Discharge water from all outlets until chlorine odor has disappeared
   - Remember: Run the chlorine solution through all fixtures, flush toilets and let water heater fill with chlorinated water

TABLE 1

WELL WITHOUT PUMP - LIQUID CHLORINE

Well Diameter		Litres of 5% Bleach per 30 Meters (100 feet) of Water in Well (for 250 mg/l (ppm) Solution)
Mm	Inches	
100	4	1.5
130	5	2.25
150	6	3.0
200	8	5.0
250	10	8.5
300	12	12.0
610	24	43.5

TABLE 2

DISINFECTION WITH CHLORINE TABLETS OR POWDER

Well Diameter		Grams of 65 – 70% Chlorine Tablets (for 250 mg/l (ppm) Solution	
Mm	Inches	g	Oz.
100	4	100	3.5
150	6	282.5	10.0
200	8	425	15.0
250	10	565	20.0
300	12	850	30.0
610	24	3400	120.00

DO Determine what, if any, municipal or provincial permits for drilling a well are required and who secures the permits.

DO Locate the well properly from the standpoint of sanitation and convenience.

DO Insist on proper housing and protection of your pumping equipment.

DO Arrange to have your pumping equipment maintained in good operating condition.

DO Enjoy the benefits of "Plenty of Water - Plenty of Pressure" - wherever you live.

GROUNDWATER FACTS

Groundwater is preferable to surface water. Groundwater from deep, drilled wells is naturally filtered and is clean, clear and pure. Some shallow wells can have contamination problems, often due to a nearby poorly installed septic system. In fact, less than one percent of all groundwater is contaminated, and in most cases is easily and affordably treated. By contrast, most surface water (lakes and rivers) is polluted and must be treated before drinking.

Groundwater is a renewable, reliable resource. Deep drilled wells recharge themselves. A deep drilled well will not fluctuate with dry weather and provides a constant, steady supply of water.

Groundwater is abundant world wide. Of all the fresh water in the world, (excluding polar ice caps) 97 percent is groundwater. Surface water (lakes and rivers) only make up three percent of our fresh water. Compared to groundwater, the total amount of available surface water is a teaspoonful.

If You Require A Water Well

CANADIAN GROUND WATER ASSOCIATION

Office of the Secretary-Manager
P.O. Box 60, Lousana, AB T0M 1K0
Phone: (403) 749-2331
Fax: (403) 749-2958

This booklet is prepared by the Canadian Ground Water Association and given to you with their compliments by the following member:

Guidelines for Water Well Construction are available through the office of the Canadian Ground Water Association.

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HOW MUCH WATER IS NEEDED?

You will use more water now and in the future than you think, when you have a good dependable well and an adequate water supply system. Consider all present and possible future uses.

- Household - for all modern conveniences and appliances - dishwasher, clothes washer, multiple bathrooms
- Whirlpool tubs or spas
- Swimming pool
- Lawn and garden irrigation
- Livestock watering
- Milk cooling - dairy cleansing
- Fruit and vegetable preparation
- Fire protection
- Field irrigation -- requirements can be determined by contacting your local office of the Ministry of Agriculture
- Air conditioning
- Groundwater geothermal heat pump for year-round heating and cooling. You might want to consider installing a groundwater geothermal heat pump, especially if you are building a new home. Groundwater geothermal heat pumps use the constant year-round temperature of groundwater to heat and cool your home or business. These systems, which can reduce annual heating/cooling bills by as much as 75 percent are the most efficient in existence today. They are four times as efficient as conventional heating and cooling units (oil, gas, coal, or electric) and twice as efficient as air to air heat pumps.

* * *

A rule of thumb might be up to 100 gallons (450 litres) per person per day for suburban living; and more than that for farm living. Definite water needs information is available from your well drilling contractor, pump installer, or appropriate Provincial government agency.

A well of ample capacity and an adequate water system will not greatly increase the overall cost of your new home in the country, yet will add more to happy comfortable modern living than any similar investment you may make.

Be sure to get sufficient well and pump capacity to have plenty of water - plenty of pressure.

WHERE SHOULD THE WELL BE LOCATED?

1. Sanitation is the most important. Always locate the well at a higher elevation than the barnyard, septic tank, and other drainage. Wells should also be located well away from highways, as road salt is a potential source of contamination in some parts of the country.

The required minimum separation between a new well and a potential source of pollution is available from the appropriate Provincial regulatory agency eg: health, environment, etc.

2. Convenience for use of water, for installation of pump, and for maintenance of well and pump is important. Your drilling

contractor can give you the best advice of where to locate the well on your lot. The well should be located in an area where it can be easily maintained -- do not put it in a basement, under a paved driveway, under power lines or under the eaves of a building.

3. The well drilling contractor, hydrogeologist, nearby neighbour, or Ministry of Environment water well log data records can give you information as to probable depth to water bearing strata and a reasonable location for your well.

HOW TO FIND AND SELECT A WELL DRILLING CONTRACTOR

Get the names of local well drilling contractors from:

British Columbia
British Columbia Ground Water Association
1708 - 197A Street,
Langley, BC V2Z 1K2
Phone: (604) 530-8934
Fax: (604) 530-8934

Alberta
Alberta Water Well Drilling Association
P.O. Box 130,
Lougheed, AB T0B 2V0
Phone: (403) 386-2335
Fax: (403) 386-2344

Saskatchewan
Saskatchewan Ground Water Association Inc.
P.O. Box 9434,
Saskatoon, SK S7K 7E9
Phone: (306) 244-7551
Fax: (306) 343-0001

Manitoba
Manitoba Water Well Association
P.O. Box 1648
Winnipeg, MB R3C 2Z6
Phone: (204) 231-3728

Ontario
Ontario Ground Water Association
2995 Delia Crescent
Bright's Grove, ON N0N 1C0
Phone: (519) 869-8933
Fax: (519) 869-8940

New Brunswick
New Brunswick Ground Water Association Inc.
30 Blair Street
Fredericton, NB E3B 5X3
Phone: (506) 455-8913
Fax: (506) 454-9834

Nova Scotia
Nova Scotia Well Driller's Association
114 Woodlawn Road, Unit 34B, Suite 219
Dartmouth, NS B2W 2S7
Phone: (902) 435-6636
Fax: (902) 434-7827

Prince Edward Island
Prince Edward Island Ground Water Association
P.O. Box 857, R.R. #2
Cornwall, PE C0A 1H0
Phone: (902) 675-2360
Fax: (902) 675-2360

Newfoundland/Labrador
Newfoundland/Labrador Water Well Corporation
P.O. Box 249
Clarkes Beach, NF A0A 1W0
Phone: (709) 786-3561
Fax: (709) 786-7386

Check on the Contractor's:

•Reliability - How long has the business been established?

•Reputation - Ask for names of satisfied customers

•Equipment - Adequate modern equipment maintained in good order.

•Licence - Does the driller have a Ministry of Environment licence?

•Membership - Members of the Province Water Well/Ground Water Association are kept up-to-date on current findings in the water well industry. They are aware of any new legislation, and they know about the latest equipment.

Ask the prospective contractor these questions:

1. Will you make a written contract for our mutual protection?

2. Do you carry adequate insurance to protect both of us?

3. Will you explain how you will construct the well?

   a) What drilling method will be used? (rotary, cable tool, etc.) Ask the contractor to explain why a particular method has been selected for your well.

   b) Size of hole and inside diameter of casing.

   c) Estimate of depth to be cased.*

   d) Estimate of total well depth.*

4. Type and material of screen, when required. This depends on the geological formation of your area.

5. Well casing -- type, quality, etc.

6. How is well sealed? Ensure that the contractor follows grouting standards.

7. How is well sterilized and disinfected to ensure high quality drinking water?

8. How is well developed to produce an optimum amount of water?

9. How is well tested for capacity?

10. Does the drilling contractor give you a copy of the well log? A well record provides you with detailed information on all aspects of your well's construction. This could be very useful years later if repairs or maintenance is required. Also, if you sell your home, please be sure to pass the well record on to the new owner.

11. Does the well contractor guarantee materials and workmanship?

12. Will further treatment of the water for such things as sulphur or iron be required? Water treatment can range from simple filters to expensive water conditioning systems. Check with the drilling contractor, pump installer, or neighbours to find out what treatment may be required.

*A contractor cannot always determine in advance the depth at which an adequate water supply will be found. Neighboring wells offer some guidance but not definite assurance.

HOW MUCH WILL A WELL COST?

Local experience will help determine the cost of high quality adequate sized wells. It is suggested that you ask the prospective drilling contractor to itemize his estimate as follows:

Drilling - per foot

Casing - per foot

Cost of other materials, drive shoe, screen, seal, etc.

Cementing - Grouting

Developing

Test pumping, etc.

Remember that a properly constructed well, and a safe and sanitary water supply, is of first importance. When well drilling contractors answer all questions reasonably, and will contract to do the work as agreed upon at a FAIR PRICE for the results wanted, then you can trust them. They will specify the quality and grade of casing, and all other materials to be used. Competitive bids should be compared on an equal basis to assure a satisfactory well for years to come.

No well drilling contractor wants to drill a dry hole. Yet they will seldom guarantee finding water or the quantity or quality, if found. You can be sure if water is there in any of the underground strata they will get it for you.

Remember, it's a life-time investment!

HOW DO YOU SELECT THE CORRECT PUMPING EQUIPMENT?

The licenced well contractor or pump installer will give you this information.

Capacity of well in gallons (or litres) per minute.

Drawdown at given pumping rates. A bailer test of well capacity is usually included in the price of the well. An actual pumping test for capacity in gallons (litres) per minute and "drawdown" is usually at an additional cost. This is justified both from the standpoint of having accurate information on the amount of water available and in clearing up the well which assures you of clear water when your water system starts operating.

Diameter of well at pumping level (the well at this depth may be smaller than casing at ground level).

Reliable well contractors or pump installers can also give you good advice as to the type and size of pump best suited to your well and water needs, and can give you a complete price on the water system installed. Many well drilling contractors sell, install and service pumps, and can advise you and supply you with a complete water system. When wells and the complete pump installations are purchased from contractors, they are given the responsibility for adequate water service. Your dependable contractor willingly accepts this responsibility.

In case your drilling contractor does not sell or install pumps, buy from your local dependable pump installer. Check on the business's dependability and reliability, just as carefully as you have checked on the drilling contractor.

In any event, have the technical installation work - the pump setting and connections, the wiring, etc. done by a licenced, experienced well drilling contractor or pump installer who will guarantee his work and render quick service when needed.

LOW YIELD WELLS

In some isolated areas, the subsurface zones are not able to produce the quantity of water expected from a domestic well (4 to 10 gallons per minute). Some homeowners forego a well, thinking that they do not have an adequate water supply. This isn't always the case. With a properly sized storage tank, and a dependable water system, wells producing as little as one gallon per minute can be adequate for domestic needs.

If you use a low yield well, you should buy a storage tank four to five times larger than your total daily consumption. This will accommodate future needs and provide excellent service to the homeowner.

SOME "DO'S" TO GUIDE YOU IN GETTING A GOOD WELL

DO Check in advance on best possible water sources.

DO Select a reputable established water well drilling contractor and then have confidence in his judgment and recommendations.

DO Insist on a written contract.

DO Insist on full coverage insurance.

DO Compare all hidden costs and materials rather than "per foot"charge.

DO Determine what, if any, municipal or provincial permits for drilling a well are required and who secures the permits.

DO Locate the well properly from the standpoint of sanitation and convenience.

DO Insist on both a certified well log (a copy of the Ministry of Environment well record) and a statement of work performed and materials used.

Well drilling contractors who enjoy good reputations, use good equipment, high quality materials, modern techniques, and are proud of their profession. They belong to their Provincial Water Well/Ground Water Associations and learn through it and its publications the most modern techniques and methods. They understand and appreciate the need for better and safer wells, and have technical knowledge of the efficient and proper use of groundwater.

SOME "DO'S" TO GUIDE YOU IN GETTING A GOOD WATER SUPPLY

DO Have the well casing extended above ground surface and the well properly grouted to prevent surface contamination.

DO Select the proper type of pump recommended as best suited to your needs.

DO Select a pump and water system large enough for your present and future needs.

DO Select a water system and all equipment, including piping, fitted to the capacity of your well and your water requirements. A well of low capacity requires longer pumping time, so that a smaller pump and larger tank may be needed.

CANADIAN GROUND WATER ASSOCIATION

in collaboration with the

GEOLOGICAL SURVEY OF CANADA

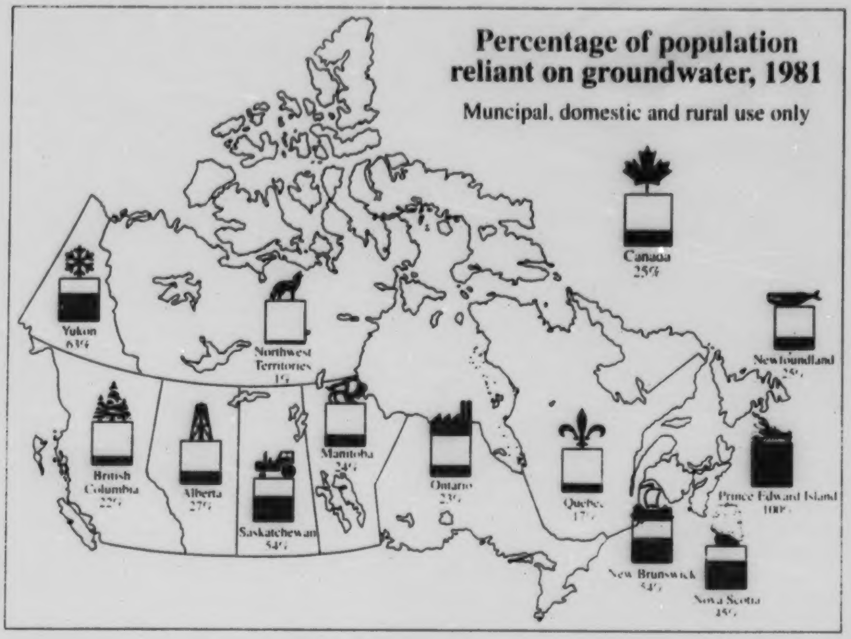
GROUND WATER IS A VITAL AND HIDDEN RESOURCE

MISSION

To encourage the management and protection of ground water by creating partnerships for public awareness and utilization.

*Six million Canadians depend on ground water. In Canada approximately 25% of the population rely on ground water for domestic use.

*Environment Canada, Fact Sheet #5



Percentage of population reliant on groundwater, 1981

Muncipal, domestic and rural use only

Canada
25%
Yukon
63%
Northwest Territories
1%
Newfoundland
25%
British Columbia
22%
Alberta
27%
Saskatchewan
54%
Manitoba
24%
Ontario
23%
Quebec
17%
Prince Edward Island
100%
New Brunswick
54%
Nova Scotia
45%

The Significance of water

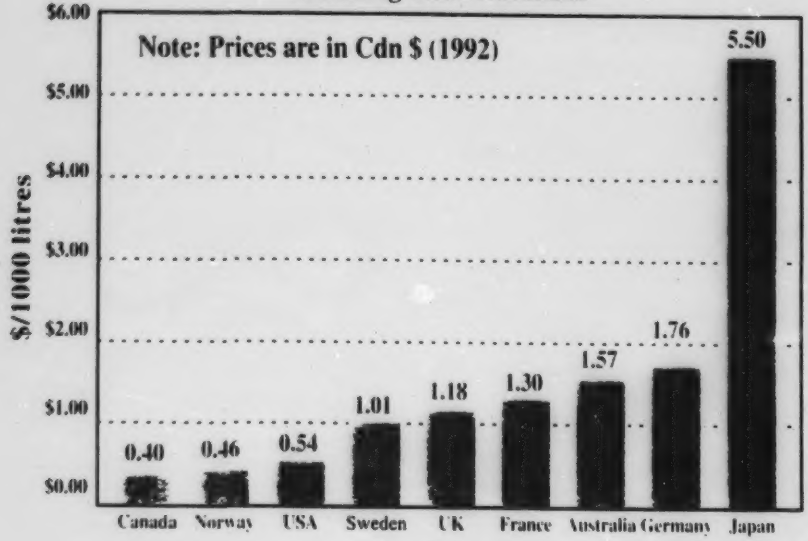
- Water is an essential and valuable resource
- Most aspects of human activity depend on the availability of water resources
- Shortages of potable water can limit economic activity (eg. agriculture, industry)

The Problems

- Canadians generally take water supply and pricing for granted
- Solutions to water shortages are expensive (eg. water pipelines)
- People are not willing to pay much for water

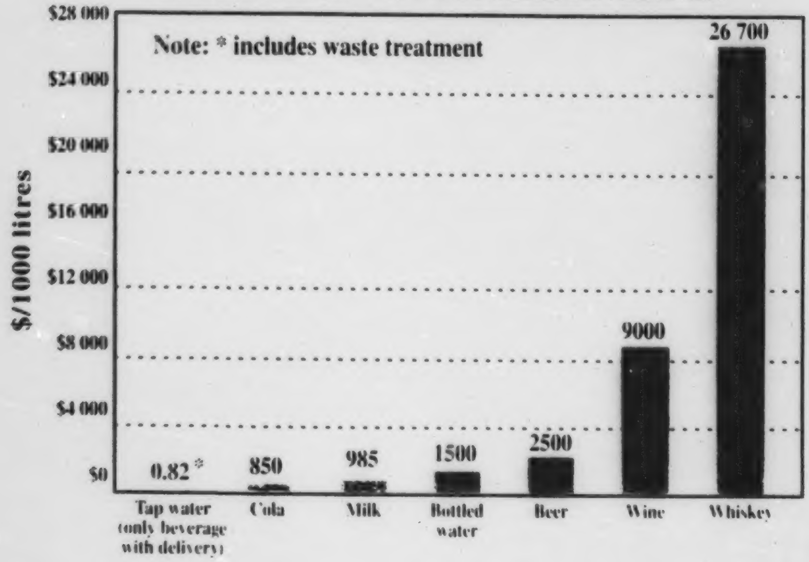
Canadians pay less per unit of water than any other first world country!

Canadian pay less per unit of water than any other first world country!


TYPICAL MUNICIPAL WATER PRICES*
* excluding waste treatment

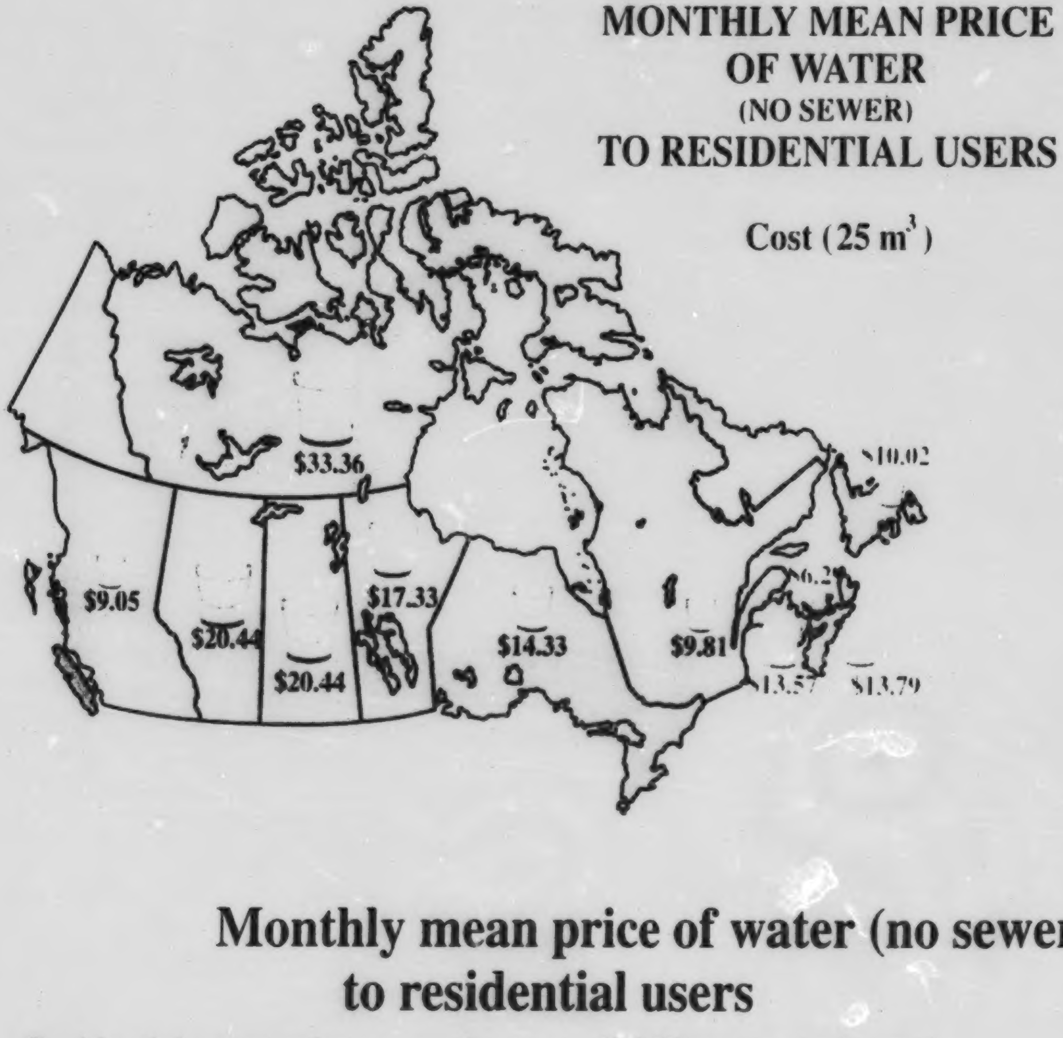
Typical municipal water prices $/1000 litres
Canadians pay less but use more water!

Canadians should be willing to invest in the management of their resources


TYPICAL PRICES FOR POPULAR BEVERAGES

Typical prices for popular beverages $/1000 litres
A modest increase in the price of water would provide financial resources to manage water resources, and groundwater, in particular

What worth does water have as a municipal supply?



MONTHLY MEAN PRICE
OF WATER
(NO SEWER)
TO RESIDENTIAL USERS

Cost (25 m^3)

$33.36
$10.02
$9.05
$20.44
$20.44
$17.33
$14.33
$9.81
$6.29
$13.57
$13.79

Monthly mean price of water (no sewer) to residential users

- Residential water prices vary due to availability, proximity and degree of treatment
- Prices for water may vary significantly across Canada
- Lowest price for water is in PEI--which is totally reliant on groundwater

A CASE STUDY FOR A MUNICIPAL WATER SUPPLY

District of Abbotsford, BC
Production Well 94-1, June 1994

INTRODUCTION

A 12 inch diameter well was drilled a total depth of 187 feet and then completed at 150 feet at a site West of Riverside Road and North of Farmer Road for water supply for the District of Abbotsford. This well 94-1 was drilled 260 feet South of well 93-1 drilled in 1993 for water supply.

Well 94-1 was completed with 10 feet of .060 and .100 inch slot 10 inch pipe size well screen set between 91 and 101 feet and 30 feet of 10 inch .018 inch slot pipe size screen set between 120 and 150 feet. The blank space between 101 and 120 feet is completed with 10 inch steel pipe to allow setting of the permanent pump at the 115 foot level to maximize the available drawdown.

Complete well and aquifer testing was carried out. A 24 hour step drawdown test was run on well 94-1 and after it had recovered fully an aquifer test was run by pumping well 94-1 at 1005 U.S. gpm, allowing it to pump for 960 minutes then adding well 93-1 and pumping it at 528 U.S. gpm and then adding the original test well (92-1) 1920 minutes into the test at 428 U.S. gpm. Well 94-1 had an original static water level of 8.68 feet and after running the test for 5800 minutes (4.03 days) the stabilized pumping level was 55.02 feet. Well 94-1 exhibits a specific capacity of 21.68 U.S. gpm per foot of drawdown with the other two wells in the well field operating at design capacity and is rated at 1000 US gpm.

The pumping level in all 3 wells had reached stabilization after 3800 minutes of pumping in the test. The completed well field has now been proven to safely provide 1950 U.S. gpm (2,808,000 gpd/10630 cubic meters/day) with adequate safety factor.

These results indicate that the nitrate contamination problems in the Abbotsford aquifer are localized. They are most likely due to over fertilization of parts of the farmland or from the old chicken barns and manure piles that are in the area. Carl Halstead of the Geological Survey had reviewed the nitrates in some aquifers around the Langley area in the late 1970's or early 80's and found that some nitrate levels were directly related to the piles of chicken manure that were overlying the unconfined sections of the aquifers.

The Abbotsford aquifer is confined at the location of this well field and this will also protect the water quality for the well field in the future. It is quite possible that the upper unconfined section of the aquifer has some noticeable nitrates however wells 93-1 and 94-1 have been constructed to obtain water from the lower, confined sections only.

COST ANALYSIS

The cost of production from the well field can be calculated as follows:

A. Total cost of the well field

1. Cost of Wells 93-1 and 94-1 $156,354.00 -	use	$160,000.00
2. Cost of Pumps - $51,462.82 -	use	60,000.00
3. Pumphouses, roads, watermains -		560,000.00
4. Well 92-1, miscellaneous -	use	220,000.00
	TOTAL	$1,000,000.00

For 1950 U.S. gpm - 2,808,000 U.S. gallons per day or 10,630 cubic meters of water.

The wells will have lives well in excess of 40 years and the pumps 20 years with planned maintenance.

B. Pumping costs

1950 gpm at an average 420 feet total dynamic head with power costs of $0.05/KW Hr.

Power requirements:

$$\text{H.P.} = \frac{\text{TDH} \times \text{GPM}}{3960 \times \text{Effic.}}$$

Where efficiency is pump bowl efficiency

$$= \frac{420 \times 1950}{3960 \times 80\%}$$

= 258 HP x .743 KW/HP

= 192 KW x 24 Hrs

= 4608 KW. Hrs per day x $0.05/KW hr.

= $230.40 per day for

2,808,000 gallons or $0.082 per 1000 gallons or $0.022 per cubic meter

The GVWD bulk rate for water is presently $0.0969 cents per cubic meter and proposed at $0.1149 for 1995. If we conservatively estimate $0.1122 per cubic meter as the cost of water the value of the well field to the District of Abbotsford is $1,192.69 per day less the pumping cost of $0.022 per cubic meter. This nets out to $0.09 per cubic meter or $956.70/day and $349,195.50 per year. On a simplistic pay back analysis with the cost of $1,000,000 and a value of $349,195.50/year the pay back is less than 3 years. If the fourth well is added to the well field as recommended this value will go up for only a small increase in cost as the pipelines and other infrastructure are already built. As the cost of surface water increases with the need to treat and the concerns in the future with chlorination and chloramination and THM production due to the chlorinated organics the value of all ground water sources will be even higher. For an area like Abbotsford that has good quality ground water it makes excellent economic sense to develop all the ground water possible and only supplement it with surface water wherever and whenever the ground water is available.

Aqua Flo Testing & Equipment Ltd.
December 20, 1994
R.F. McNichol, AScT.

A FARM WATER SUPPLY
an Alberta example

The calculations in this example are based upon the following criteria:

(a)	Completed depth of water well	180 feet
(b)	Assumed life of the well	20 years

(c) Consumption of water is based on Alberta Agriculture and Rural Development figures for farm use:
- Family of 4 people
- 200 head of beef cattle

(Consumption figures do not include other specific uses of water, such as spraying of agricultural chemicals).

Cost of water well

1.	180' x $22.00 per foot (drilling and casing 5.5") =	$3,960.00
2.	Pump (10 gpm capability) and related equipment =	2,000.00
3.	20 year operating and maintenance costs (which includes power, pump replacement, etc.) =	7,500.00
	TOTAL COST	$13,460.00

Water Consumption

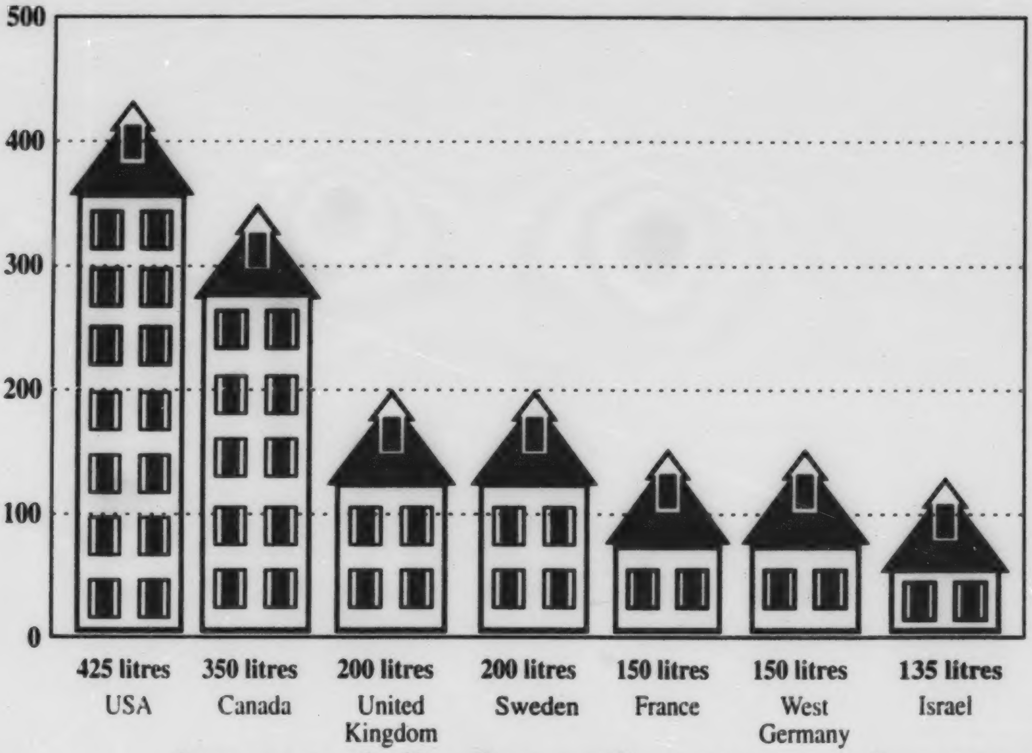
1.	4 people x 75 gpd each = 300 gpd x 365 days x 20 years	=	2,190,000 gallons
2.	200 head of cattle x 15 gpd each = 3000 gpd x 365 days x 20 years	=	21,900,000 gallons
	20 year total water consumption	=	24,090,000 gallons
	Total cost divided by total consumption	=	$0.0005587/gallon

Conversion rate of gallons to litres

4.546 litres = 1 Gallon (imperial)
Number of gallons x 4.546 = litres

There is room for conservation of water in Canada

AVERAGE DAILY HOUSEHOLD WATER USE (PER CAPITA)



Average daily domestic water use by country

Acknowledgement to Environment Canada
for information supplied in this Fact Sheet.

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CANADIAN GROUND WATER ASSOCIATION ASSOCIATION CANADIENNE DES EAUX SOUTERRAINES

FACT SHEET #2

THE QUALITY OF GROUND WATER

PRODUCED BY:

CANADIAN GROUND WATER ASSOCIATION

In collaboration with the

GEOLOGICAL SURVEY OF CANADA
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NATURAL RESOURCES CANADA

GROUND WATER IS A VITAL AND HIDDEN RESOURCE

- Factors Affecting Ground Water Quality
- Canadian Water Quality Guidelines
- Ground Water Treatment Methods

INTRODUCTION

Ground water is an essential and vital resource for many Canadians. This fact sheet includes information on factors affecting ground water quality, Canadian drinking water quality guidelines, and a summary of ground water quality problems, their causes and possible solutions.

Ground water does not usually contain suspended particles, has practically little or no natural bacteria or organic matter and is often more hygienic than surface water. Most ground water has a nearly constant temperature and is clear and odourless, although it can contain more dissolved minerals than surface water. The concentration and nature of dissolved minerals affects the usefulness of ground water and in some instances treatment may be necessary it improve its quality. Some dissolved minerals are essential for good health while others, if present in excessive amounts, may cause health problems or affect the appearance and palatability of the ground water. This fact sheet is designed to be of particular interest to well drillers and their clients.

FACTORS AFFECTING GROUND WATER QUALITY

Ground water may become contaminated so it is important that wells be constructed following recommended guidelines and be drilled at locations that are remote from sources of contamination. The contamination and protection of ground water is the subject of a separate fact sheet.

Water is an important solvent. As it passes through soil and rocks it slowly dissolves most materials and picks up their various mineral constituents. These dissolved minerals are rarely harmful to health, and in low concentrations, may give the water a pleasant taste. The most common dissolved elements in ground water include sodium, calcium and magnesium, which combine to form bicarbonates, sulphates and chlorides.

The composition of ground water is determined mainly by the length of time it takes to move through the ground and by the character of the sediments and rock materials it comes in contact with.

Travel time

The longer the period of contact between water and the ground, the greater the opportunity for minerals to be dissolved. Water from deep wells has typically had a long travel time and opportunity to dissolve minerals during its journey. In contrast, water from shallow wells has usually had a shorter travel time and therefore often contains lower concentrations of dissolved minerals. The permeability of earth materials also affects the speed ground water can move and consequently, its quality. Ground water moves slowly through clay and because of this slow movement there is more time for minerals to dissolve. Sediments, such as sand, allow ground water to move quickly so there is less time for materials to dissolve and the ground water is usually less mineralized.

Chemical composition

The chemical composition or reactivity of minerals in the ground also affects ground water quality. Sandy sediments have lower dissolved solids than clays, not only because of lower flow rates, but because they are less reactive than clays. Some components of minerals, like sodium, sulphate and chloride are highly soluble; thus ground water passing through deposits containing high concentrations of these substances will have a relatively high mineral concentration.

CANADIAN WATER QUALITY GUIDELINES

Units of Measure

The concentration of dissolved substances is normally expressed in milligrams per litre (mg/L), which for potable water can also be referred to as parts per million or ppm. In some cases trace concentrations of dissolved substances will be listed as micrograms per litre (µg/L), or parts per billion (ppb). Some water treatment specialists use the term grains per gallon (gpg) as a measure of dissolved mineral concentration. Table 1 summarizes the main units of measure and equivalent terms.

Table 1: Units of measure.

Unit of Measure	Equivalent Unit of Measure
milligrams per Litre (mg/L)	parts per million (ppm)
micrograms per Litre (µg/L)	parts per billion (ppb)
grains per US gallon (g/USgal)	17.1 mg/L (or 17.1 ppm)
grains per I gallon (g/Igal)	14.3 mg/L (or 14.3 ppm)

Explanation of Terms

When ground water is analysed the results should be compared with the latest version of the Guidelines for Canadian Drinking Water Quality, published by Health Canada. Parameters or chemicals which are known to have harmful human health effects are listed with a maximum acceptable concentration (MAC). An interim maximum acceptable concentration (IMAC) or an aesthetic objective (AO) may also be listed. Local health authorities may provide some guidance on other water quality parameters in the form of recommended limits. Definitions of these terms are given in Table 2:

Table 2: Water Quality Terms and Definitions.

Term	Definition
Aesthetic Objective (AO)	AOs are for specific parameters which affect water quality based on smell, taste or color. There are substances which fall under aesthetic objectives which in high enough quantities may impose a health risk.
Maximum Acceptable Concentration (MAC)	MACs have been developed for parameters, or substances, which are known or suspected to cause deleterious health effects. This term assumes the parameter would be consumed over a lifetime at that concentration.
Interim Maximum Acceptable Concentration (IMAC)	IMACs are listed for substances for which not enough information is known to determine a Maximum Acceptable Concentration.

Water Quality Parameters

Table 3 lists selected parameters commonly analysed when determining the potability of ground water. For a more complete list of parameters and guidelines consult your local health unit or refer to the Guidelines for Canadian Drinking Water Quality. Regional variations in ground water quality do occur and these different qualities of water may be acceptable for drinking, cooking and other domestic purposes.

Table 3. Guidelines for Selected Water Quality Parameters.
(values are in mg/L, unless otherwise stated)

Parameter	Guideline Concentration	Comments
Arsenic	IMAC 0.025	Has been correlated with a variety of clinical disorders in humans. Naturally high in some areas.
Calcium	Not defined	A constituent of hardness.
Chloride	AO ≤ 250	Excessive chloride gives water a salty taste.
Conductivity	Not defined	A measure of the total amount of dissolved minerals in the water.
Hardness	Not defined	Water supplies with a hardness of greater than 200 mg/L (as calcium carbonate) are considered poor but have been tolerated, those in excess of 500 mg/L are unacceptable for most domestic purposes.
Iron	AO ≤ 0.3	Not a health hazard unless at extreme levels; can result in red or brown stains on clothes and fixtures at concentrations above 0.3 mg/L; may promote the growth of iron bacteria.
Sulphide	AO ≤ 0.05	The presence of sulphide in water (as hydrogen sulphide) results in disagreeable taste and odor.
Fluoride	MAC 1.5	May cause objectionable dental fluorosis (characterized by mottling of teeth) if over 1.5 mg/L.
Lead	MAC 0.010	A cumulative general poison classified as being possibly carcinogenic.

Magnesium	Not defined	Contributes to hardness and has an offensive taste.
Manganese	AO ≤ 0.05	Stains laundry and plumbing fixtures. May lead to the accumulation of microbial growths.
Nitrate-Nitrogen	MAC 45 (equal to 10 mg/L as nitrogen)	In high concentrations is most dangerous to pregnant women and bottle-fed infants causing "Blue Baby Syndrome". At concentrations exceeding the MAC, contamination from animal or human waste should be suspected.
Selenium	MAC 0.01	Has been correlated with a variety of clinical disorders in humans. Naturally high in some areas.
Sodium	AO ≤ 200	At concentrations approaching 200 mg/L has an offensive taste. For people suffering from high blood pressure or heart conditions the concentration of sodium in water is an important consideration and would probably have to be less than 20 mg/L. Water softening usually increases sodium content.
Sulphate	AO ≤ 500	Can cause diarrhea and has an objectionable taste.
Total dissolved solids (TDS)	AO ≤ 500	Indicates the total amount of dissolved minerals in water. Over 1000 mg/L is considered high but the effects of TDS depend on the concentration of components; hardness, taste, mineral deposition and corrosion.
Turbidity	MAC 1 (NTU)	Caused by suspended matter, such as clay, silt, finely divided organic and inorganic matter.
Uranium	MAC 0.1	Can cause kidney damage. Naturally high in some areas.
Total Coliform Bacteria	MAC is zero organisms per 100 mL	These organisms are found in the intestines of man and animals and also in soil and on vegetation. If up to 10 total coliform organisms per 100 mL are detected the water should be resampled. If coliforms are confirmed the health authority should be advised and corrective action taken.
Faecal Coliform Bacteria	MAC is zero organisms per 100 mL	These organisms are found only in the intestines of man and animals. Their presence at any level indicates the water is contaminated with human sewage and/or animal manure and the water is unsafe to drink.
Iron Bacteria	No defined limit	Not necessarily a health hazard but, can cause slime and clogging of well screens and pumping equipment.
pH	AO 6.5 to 8.5	Results from a balance between dissolved carbon dioxide gas derived from the atmosphere and the dissolved carbonates and bicarbonates derived from carbonate rocks. A pH of 7 is neutral, less than 7 is an acidic solution and greater than 7 is an alkaline solution.

NTU = Nephelometric turbidity units
≤ = Less than or equal to

Adapted from Guidelines for Canadian Drinking Water Quality, 6th Edition, (1996) published by Health Canada.

Well owners should ensure that testing of well water quality is conducted at a regular frequency. It is recommended that bacteriological analyses be completed each year in the spring and fall. Analyses for routine chemistry may be completed less frequently, possibly every five years, or earlier, if a change in quality is apparent. Check with a local health authority regarding the frequency of laboratory anaylses, as local conditions may vary. The results of analyses should be compared with the Guidelines for Canadian Drinking Water Quality and an assessment made of the need to treat the water. A smart well owner will review the results of analysis with a reputable water treatment company and obtain independent advice about water treatment from a government agency.

GROUND WATER TREATMENT METHODS

The Three Main Types Of Treatment

When treating water to improve ground water quality there are three main aspects of treatment to consider: disinfection, improving aesthetic qualities and reducing the concentration of harmful chemicals.

Disinfection refers to improving water quality by killing or inactivating disease causing micro-organisms in a water supply. Bacteria like faecal coliform; and viruses like cholera are examples of microbial contaminants that disinfection methods target. Cysts like *Cryptosporidium sp.* and *Giardia lamblia* (primarly a concern for surface water and ground water under the influence of surface water) can be treated when conventional disinfection methods are combined with filtration.

Improving aesthetic qualities is the most common purpose for point of use (POU) and point of entry (POE) water treatment devices. Taste, odour, hardness and color are all aesthetic characteristics of water which can be improved by a variety of filtration methods, demineralization (or softeners) or distillation. Often harmful chemicals are removed by the same means used to treat offensive aesthetic qualities. Common ground water quality problems, probable causes and possible solutions or treatment methods are summarized on Table 4.

Table 4. Common Ground Water Quality Problems, Probable Causes and Possible Solutions.

PROBLEM	**PROBABLE CAUSE**	**POSSIBLE SOLUTIONS**
Health problems	Coliform bacteria	Investigate source immediately; chlorination, UV lights, ozonation
Scale deposits on fixtures and appliances, soap scum and high soap consumption	Hard water	Water softener
Red or orange stains on laundry or fixtures; metallic taste, rust particles after water sits	Iron	Water softener, greensand filter, chlorination/filtration
Black stains on laundry or fixtures, metallic/bitter taste in coffee and tea	Manganese	Water softener, greensand filter, chlorination/filtration
Red to brown slime in toilet tank, iron staining, unpleasant taste or odour	Iron bacteria	Shock chlorination of water source and entire system
Acid water, causing corrosion of piping (green staining due to copper corrosion)	Low alkalinity, presence of carbonic acid, sometimes mineral acids such as sulphuric acid	Soda ash, neutralizing tank
Rotten egg odour and flavour, silverware may turn black, worse in hot water	Hydrogen sulphide and/or sulphate-reducing bacteria	Greensand filter, chlorination/filtration. Aeration, activated carbon
Cloudy, dirty or muddy appearance	Turbidity	Fine filters (sand or diatomaceous earth), coagulation (alum) & filtration

High blood pressure	Sodium (most dietary sodium does not come from water, so water may not be the cause of the problem)	Reverse osmosis, distillation
Salty taste, corrosive	Chloride	Reverse osmosis, distillation, anion exchange
Gas bubbles escaping from water	Gases such as methane	Aeration, activated carbon
Laxative effects	Sulphate	Reverse osmosis, distillation, anion exchange
Health problems	Arsenic	Reverse osmosis, distillation, activated alumina, ferric hydroxide, anion exchange
Health problems	Uranium	Reverse osmosis, distillation
Oil smell or film on water	Gasoline and/or oil	Investigate and eliminate source first; activated carbon, gravity separation, air stripping.
"Blue babies" in formula fed infants under 6 months	Nitrate	Reverse osmosis, anion exchange, use nitrate-free water or formula preparation

Adapted from Report 68-3 (Fifth Revision 1997), Nova Scotia Department of the Environment. "Before you Construct A Water Well, Facts a Homeowner Should Know".

SUMMARY

Ground Water Quality

As water moves through the subsurface, it changes in quality. Earth materials naturally filter out most bacteria. Ground water is usually clear, colorless and of excellent sanitary quality. All ground water contains dissolved minerals. These dissolved minerals are rarely harmful to health and the composition of ground water is mainly determined by its travel time and composition of the sediments and rocks it moves through.

Water wells should be constructed at locations remote from potential sources of contamination using approved well construction guidelines. Being proactive about a potential water quality problem is far cheaper and often less time consuming than trying to remedy a contaminated well.

Water Quality Guidelines

It is recommended that wells be regularly sampled and the results of bacteriological and chemical analyses compared with the most recent edition of the Guidelines for Canadian Drinking Water Quality, published by Health Canada.

Water Treatment

Having determined the nature and chemical composition of a ground water supply a treatment device may be required. Water quality problems and treatment devices are summarized in Table 4. A number of reputable water treatment companies should be consulted for advice and quotations obtained before purchasing water treatment equipment. It is a good idea to obtain independent advice on water treatment methods from a provincial government agency, if possible.

CANADIAN GROUND WATER ASSOCIATION **ASSOCIATION CANADIENNE DES EAUX SOUTERRAINES**

FACT SHEET #3

GROUND WATER CONTAMINATION AND PROTECTION

PRODUCED BY:

CANADIAN GROUND WATER ASSOCIATION

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GROUND WATER IS A VITAL AND HIDDEN RESOURCE

INTRODUCTION

"Ground water is an essential and vital resource for about a quarter of all Canadians" according to Environment Canada. In recent years, a number of events affecting ground water quality have lead to increased public awareness of the importance of ground water and the vulnerability of this precious resource.

Ground water exists almost everywhere underground in the spaces between rocks, grains, or in crevices and cracks in rock. An *aquifer* is an underground reservoir of permeable water-bearing material or rock which can yield useful quantities of water to a well completed in these deposits. Even where aquifers are not used for water supplies we must still protect ground water since it can carry contaminants from the land into lakes and rivers thus affecting aquatic life and the freshwater supplies of other people.

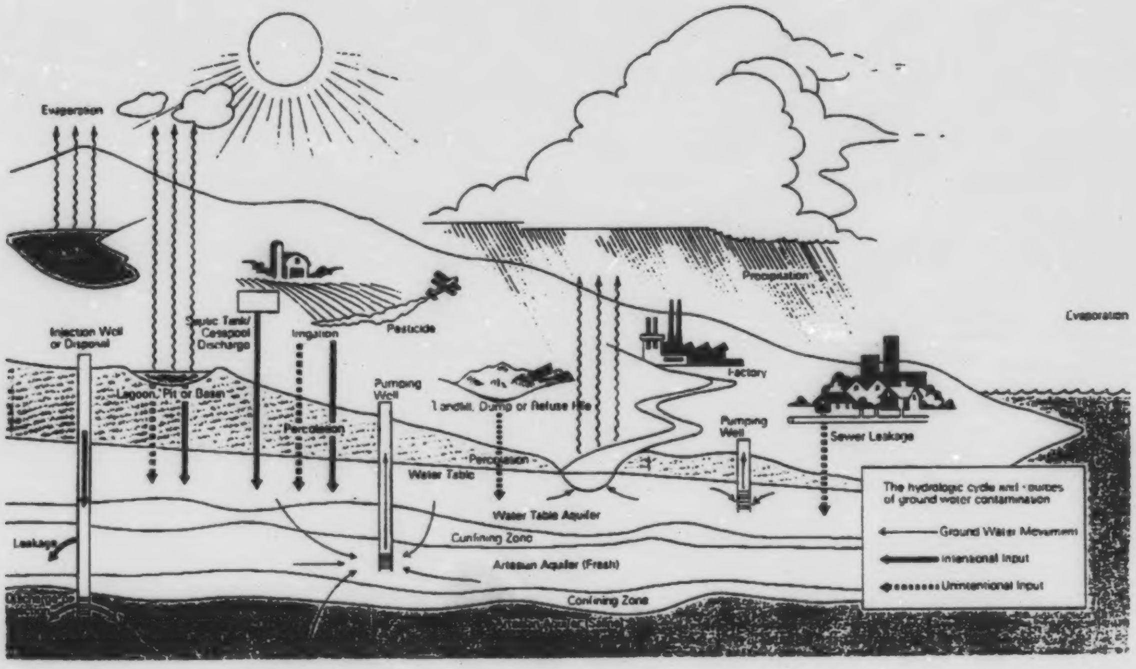
Because of the general concerns about water quality many government agencies and other organizations are implementing comprehensive water quality protection strategies. In addition, water well construction regulations and standards have been developed by industry and the provincial government regulatory agencies. The Canadian Ground Water Association published revised Guidelines for Water Well Construction in 1995. This set of guidelines provides a standardized set of water well construction recommendations that can be used across the country. The need to properly construct, correctly install and maintain wells and pumping systems and to limit the risk of contamination of ground water from historic, existing or future land uses cannot be overemphasized.

This Fact Sheet explains how ground water can become contaminated and the sources that can cause ground water contamination. Prevention of pollution is the only effective approach, as remediation of contaminated aquifers is very costly and often not feasible. What is required, is an understanding of contaminant sources, well construction using recommended guidelines, and the appropriate use of land.

GROUND WATER CONTAMINATION

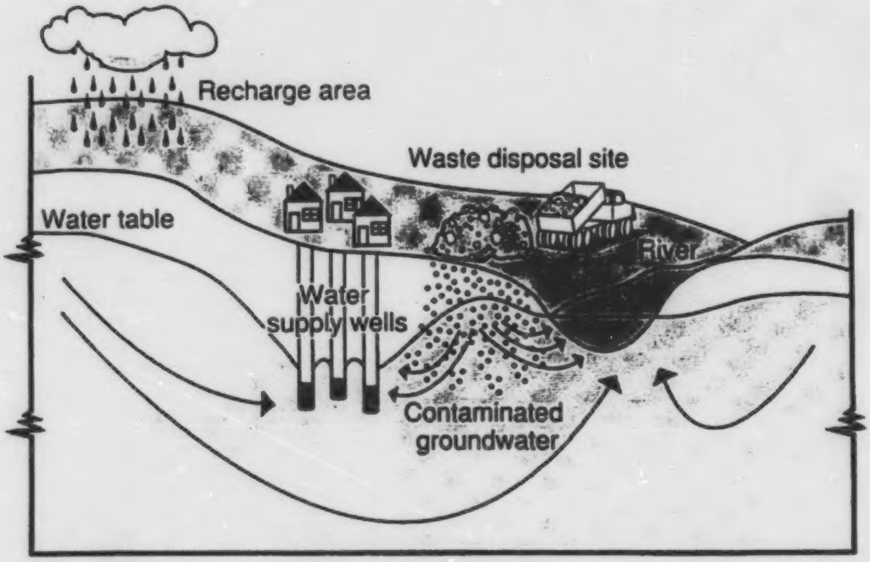
Ground water for the most part is a reliable and safe source of potable water. However, there have been many cases where ground water supplies have been contaminated leading to the closure of water supply wells. Any addition of undesirable substances to ground water caused by human activities is considered to be contamination. Figure 1 illustrates how contamination of ground water may occur as a result of several causes.

Figure 1: Sources of Ground Water Contamination


Evaporation
Injection Well or Disposal
Septic Tank/ Cesspool Discharge
Irrigation
Pesticide
Lagoon, Pit or Basin
Percolation
Pumping Well
Landfill, Dump or Refuse Pile
Precipitation
Factory
Evaporation
Pumping Well
Sewer Leakage
Percolation
Water Table
Water Table Aquifer
Confining Zone
Artesian Aquifer (Fresh)
Leakage
Confining Zone
The hydrologic cycle and sources of ground water contamination
Ground Water Movement
Intensional Input
Unintentional Input

It has often been assumed that industrial waste and other contaminants left on or under the ground would be securely contained. This has been shown to be wishful thinking as contaminants leach out and move downwards into the underlying ground water. Ground water often spreads the effects of dumps and spills far beyond the source of contamination. Both surface water and ground water can be affected.

Figure 2 - Ground Water Contamination from a Waste Disposal Site (Environment Canada. 1990)


Recharge area
Waste disposal site
Water table
River
Water supply wells
Contaminated groundwater

Contamination Sources

There are numerous potential sources of ground water contamination which are usually grouped together as point sources and non-point sources.

Figure 3 - Hydrogeologic Section Showing Sources of Point Source Contamination (U.S. Geological Survey)

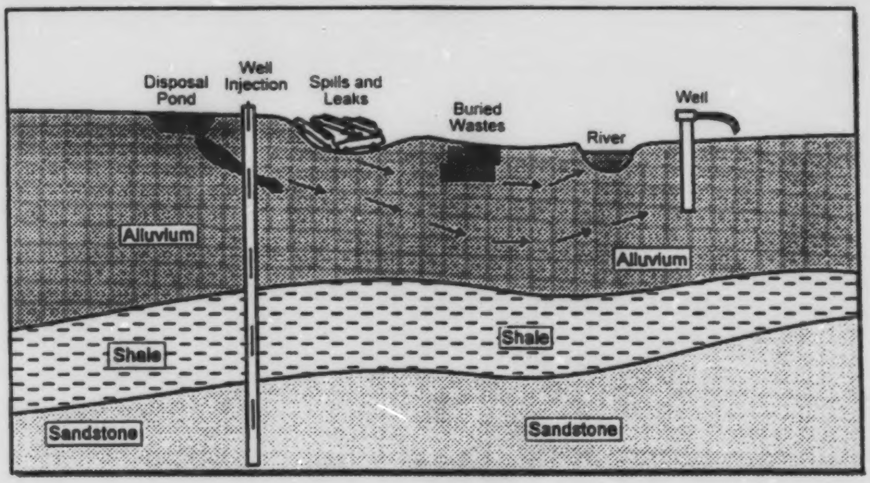

Disposal Pond
Well Injection
Spills and Leaks
Buried Wastes
River
Well
Alluvium
Alluvium
Shale
Shale
Sandstone
Sandstone

Figure 4 - Sources That Can Cause Ground Water Contamination (Environment Canada. 1990)

Point Sources
Onsite septic systems
Leaking tanks or pipelines
Leaks or spills from manufacturing facilities
Underground injection wells
Municipal landfills
Livestock wastes
Leaky sewer lines
Wood preserving chemicals
Mine tailings
Fly ash from coal-fired power plants
Sludge disposal areas at petroleum refineries
Land spreading of sewage or sewage sludge
Graveyards
Road salt storage areas
Runoff of salt and other chemicals from roads
Spills related to highways or railway accidents
Coal tar at old coal gasification sites
Asphalt production and equipment cleaning sites

Non-point (distributed) Sources
Fertilizer on agricultural land
Pesticides on agricultural land and forests
Contaminants in rain, snow, and dry atmospheric fallout

Landfills, underground storage tanks, septic tank systems, and spills are examples of potential point sources of ground water contamination. The infiltration of fertilizers from farm land below the root zone is an example of a non-point source of ground water contamination. Municipal landfills and industrial waste disposal sites are significant point sources and in some cases have resulted in widespread contamination. Most of these sites, however, are well documented and regularly monitored.

Often the biggest contamination threats are related to the way a well is constructed, its depth or how it is maintained. If the annulus of a well is not sealed properly it can provide a direct path for contaminants to move from the ground surface to the aquifer the well is completed in. Shallow wells are at greater risk of contamination than deeper wells because there may not be sufficient overlying formations of low permeability, such as clay, to act as a natural filter, delaying the downward movement of contaminants into their aquifers.

Older wells, that may not have been constructed to today's standard, or that have deteriorated over time and are now considered to be substandard, can become contaminated or can cause good wells to become contaminated. This process occurs through the seepage of contaminated surface water or poor quality, shallow ground water into a deeper good quality aquifer. A poorly maintained well pit can also contribute to aquifer contamination because any water that pools on the floor of the pit can travel down the outside of the casing if the annulus is not properly sealed, seep down through the pit floor into shallow ground water aquifers, or enter over the top of the well if the casing is not properly capped or is not high enough above the pit floor. In addition, to the issue of contamination that can occur through a well pit there have been a number of "confined space" health and safety problems, including deaths, resulting from the accumulation of naturally occurring but harmful gases or reduced oxygen concentrations in well pits. No person should enter a well pit until the oxygen levels in the pit have been determined to be safe.

Figure 5 - Well Contamination (Alberta Agriculture, Food and Rural Development, 1996)

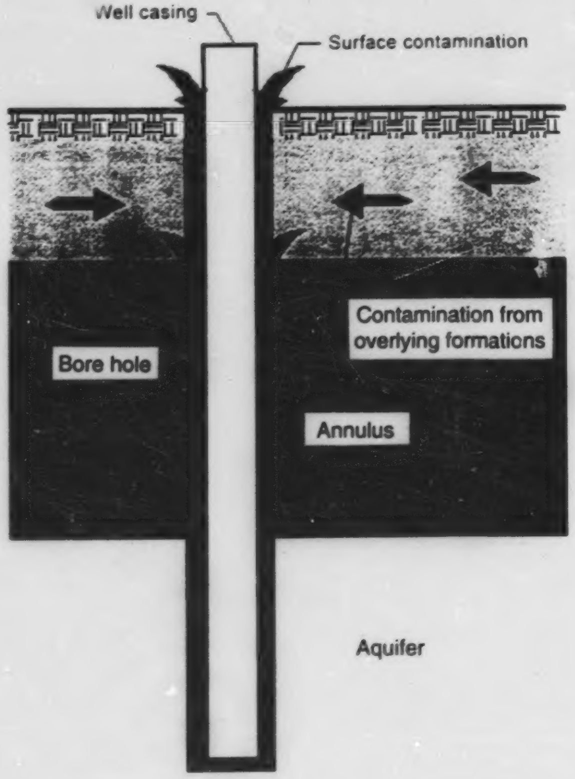
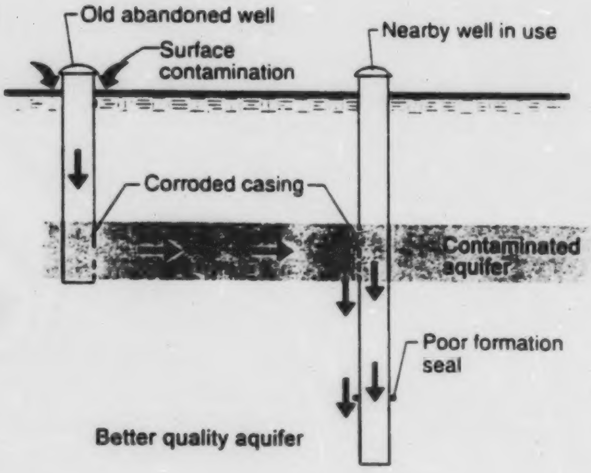


Figure 6 - Contamination from an abandoned well (Alberta Agriculture, Food and Rural Development, 1996)



Well Management

Good well management includes appropriate well location and good housekeeping practises around the well. Well pits are not recommended. The CGWA *Guidelines for Well Construction* strongly recommends the use of pitless adaptors or pitless units. Pitless adaptors provide a safe, sanitary and frost-free connection from the well to the pumping system. Wells should be located up slope from any source of contamination such as septic systems, feed lots and manure storage; pesticides and chemicals should be mixed in separate tanks away from the well. Back siphoning of chemicals into the well is a concern and measures should be taken to ensure that the water required for the mixing of chemicals is not taken directly from the well.

GROUND WATER PROTECTION

Ground water protection programs are becoming more common in Canada. Many municipalities and communities that rely on ground water are taking this proactive stand to safeguard the quality of their water resources from historic, existing and future land uses. The programs typically involve three (3) main steps:

1. Understanding the flow of ground water and identifying land areas that contribute water to municipal wells.
2. Identifying potential sources of contamination in the sensitive or vulnerable areas identified in step 1.
3. Developing and implementing policies and programs to manage potentially harmful land use practices in the sensitive areas.

In order to protect ground water it is necessary to identify and map the land areas that contribute water to an aquifer and/or well. Several terms are used in the process of understanding and delineating ground water protection areas. These terms are summarized as follows:

a) *Recharge area* - land area through which precipitation infiltrates to recharge an underlying aquifer. For unconfined aquifers essentially all of the overlying land acts as a recharge area. For confined aquifers the recharge area will depend on the thickness, nature and extent of the confining layer and of the deposits overlying it. In some cases the recharge area for a confined aquifer can be several kilometres away.

b) *Capture area* - the whole of the land area recharging or contributing water to a well. This is essentially equivalent to a recharge area for a specific well.

c) *Time of travel* - the time taken for a drop of water to travel from a point on the ground surface or in the aquifer to a pumping well. It is possible to draw lines around a pumping well representing equal times of travel (e.g. two years and ten years).

In addition to the hydrogeological studies, other components of a ground water protection assessment would include an inventory of contaminant sources, water quality monitoring/ assessment, the management of data, the development of contingency plans and public education/ consultation. The latter is a key component to the success of these programs, as the public needs to understand and value the ground water studies and the development of land use management solutions.

Ground water protection programs may result in recommendations such as:

a) Inclusion of both "Wellhead Protection Areas" and "Aquifer Protection Recharge Areas" in ground water protection areas. This provides protection for both existing wellfields and the protection of other ground water resources that may be used for future municipal supplies or are already used by private water users.

b) Delineation of "Wellhead Protection Areas" should be based on ground water time of travel (T o T) within the aquifer. An inner area, with a shorter T o T (e.g. 1 year) and an outer area with a longer T o T (e.g. 5 years) should be defined. Certain future land use practices would be restricted from one or both zones.

Recommended Guidelines for Water Well Construction

The use of recommended guidelines for well construction can significantly reduce the risk of well contamination, increase the longevity of a potable ground water supply and avoid the costs associated with drilling and developing a new well. Guidelines for well construction are available from the Canadian Ground Water Association, from provincial industry associations, or from provincial environmental regulatory agencies.

CANADIAN GROUND WATER ASSOCIATION ASSOCIATION CANADIENNE DES EAUX SOUTERRAINES

FACT SHEET #4

GUIDELINES FOR SANITIZING A WATER WELL

PRODUCED BY:

CANADIAN GROUND WATER ASSOCIATION

In collaboration with the

RED DEER COLLEGE

NOTICE TO READERS: ASSUMPTION OF RISK AND EXCLUSION OF LIABILITY

The procedures and products described herein are EXTREMELY DANGEROUS and should only be undertaken with the utmost caution. Improper sanitization of a well can cause serious illness or death.

The Canadian Ground Water Association and Red Deer College hereby disclaim any liability or responsibility for any injury or damage resulting from the use, directly or indirectly, of the information contained herein.

Preface:

For almost 30% of Canadians who use ground water as their sole source of water, a real value cannot be established. The mission statement of the Canadian Ground Water Association is to encourage the management and protection of the resource.

The recommendations and procedures in these guidelines are minimum guidelines, however it must be emphasized that they will meet the criteria set out in most existing regulations and legislation.

The terms disinfecting and sanitizing for all intents and purposes mean the same and are both used in the text of this Fact Sheet.

1.0 GENERAL GUIDELINES:

1.1 Every well shall be located:

1.1.1. At the highest point on the site consistent with the general layout and surroundings, but also protected against surface wash or flooding and surrounded by an area which can be kept in a sanitary condition.

1.1.2. As far removed from any known or probable source of contamination as the general layout of the premises and surroundings permit and in accordance with all provincial, health, sanitation, and sewage disposal regulations.

1.2.1 Use of pitless adapters or pitless units are recommended by the Canadian Ground Water Association.

1.2.2 All well caps or covers should be water tight, insect proof, and vented.

(From Guidelines for Water Well Construction - Canadian Ground Water Association 1995)

1.3 The bacteria and viruses picked up on drilling tools, pipes and pumps during construction or servicing of a well are commonly those living in the soil at or near the well site and are usually non pathogenic. However, the bacteria used as an indicator of possible disease - producing bacteria may be among them.

This indicator bacteria is known as coliform bacteria, and if present, is taken as evidence that the water may contain disease producing organisms that live in the intestinal tracts of man and other warm blooded animals.

Since identification of disease producing micro-organisms is difficult, tests are generally done for the number of coliform bacteria and not for the absence of pathogenic bacteria. Water from a well is considered safe to drink when tests show that it contains O coliform bacteria per 100 mL.

1.4 Fecal coliform bacteria , which include E.coli, are normal organisms found in the intestinal tract of all mammals. Most coliform bacteria, including E.coli, are important in digestive processes of humans and animals.

E.coli 0157:H7 is one particular type which can cause disease in humans and the symptoms range from mild diarrhea to kidney failure and death.

Their presence at any level indicates the water is contaminated with human sewage and/or animal manure and the water is unsafe to drink. Maximum acceptable concentration is 0 per 100 mg/L.

Bacteria contaminations, both non-pathogenic and pathogenic can occur or be introduced during drilling, pump servicing, or any time the well is open for repair or maintenance. An example of this has occurred because vermin proof well caps were not used and earwigs entered the well creating a bacteria invasion. Coliform bacteria may also enter wells from surface sources of contamination via faulty well seals or faulty casing seals (eg: poor well caps, unsealed or ungrouted annular space outside the casing etc.)

1.5 Other bacteria, (eg: sulphate reducing bacteria and iron bacteria), may not necessarily be a health problem but may cause reduced well production, staining, and plugging of distribution systems.

1.5.1 IRON BACTERIA are often found in wells completed in aquifers which have a high iron content. Iron bacteria oxidize dissolved (ferrous) iron, forcing it to come out of solution. The oxidized (ferric) iron is deposited on the well casing/screen. As iron bacteria multiply, they produce a stringy jelly-like slime. A combination of the iron deposit and bacteria build-up on casing perforations, screen slot openings and in the pore spaces of the water bearing formation, can reduce the yield of a well.

1.5.2 SULPHATE-REDUCING BACTERIA can be a problem in wells completed in aquifers which have a high content of naturally occurring sulphate. Sulphate-reducing bacteria generate sulphides from sulphate and produce hydrogen sulphide gas (H_2S), which is characterized by a "rotten egg" odour. H_2S gas corrodes iron and steel casing/screens and produces a scale called ferric sulphide (FeS_2). As this scale deposits and the sulphate-reducing bacteria accumulate, the slot openings on the casing/screen become plugged, and the well yield is reduced.

2.0 DISINFECTION/SANITIZING:

2.1 Disinfection of any well will kill only the bacteria present in the well or on the pumping equipment. However, if there is some external source of contamination, the problem will be solved only temporarily by a single application of chlorine solution.

2.2 In order to protect water wells from contamination by iron bacteria, a minimum chlorine residual of 250 mg/l (ppm) should be maintained in the drilling fluid continuously.

This will serve to disinfect any drill tools used during the drilling operation.

2.3 Every well, after construction or repair, should be disinfected.

3.0 TIME OF DISINFECTION:

3.1 Normally, the time that a well should be disinfected is when construction is considered complete and the well has been tested for yield. It should, however, be disinfected preceding the collection of any samples for determination of bacteriological quality.

3.2 If a well is intended for the production of water for human consumption, the driller shall:

3.2.1 where he installs the pump fittings, disinfect the well after the installation of the pump fittings, and

3.2.2 where he does not install the pump fittings, disinfect the well when he completes his work on the well.

4.0 CHLORINATION:

4.1 The quantity of chlorine compounds used for disinfecting a well shall be sufficient to produce two hundred and fifty (250) mg/l (ppm) of chlorine solution when mixed with the total volume of water retained within the well. Refer to Tables 1 and 2.

4.2 Well without pump - liquid chlorine: measure the diameter of the well and calculate the volume of chlorine bleach (5.25% active chlorine) required using Table 1. Take the volume of chlorine bleach determined from the Table and mix this in at least forty-five (45) litres (ten (10) gallons) of water. Pour this solution into the well and let it stay in the well for at least twelve (12) hours. Pump the well for at least one (1) hour to remove the chlorine solution.

4.3 Well with pump - liquid chlorine: measure the diameter of the well and calculate the volume of chlorine bleach (5.25% active chlorine) required using Table 1. Take the volume of chlorine bleach determined from the Table and mix this in at least forty-five (45) litres (ten (10) gallons) of water. Pour the solution into the well between the drop pipes and the outer casing. This may be done by pouring or siphoning through the air vent or by removing the well seal. Where the casing has a well cap, remove the well cap and pour the solution directly into the well. Open all faucets in the system and let the water run until the chlorine odor is detected. Turn the water off and add a second volume of chlorine bleach (the same amount as initially added). Seal the top of the well. Let the system sit idle for twelve (12) hours. Discharge the water from all outlets until chlorine odor has disappeared. Faucets on fixtures discharging to septic tank systems should be temporarily diverted to an outside discharge point, to avoid impacting the disposal system.

4.4 Disinfection with chlorine tablets or powder: chlorine tablets normally contain about 65 to 70% available chlorine present in calcium hypochlorite. **Users should be aware that these tablets may cause chemical burns, fire, or explosion if adequate safety precautions are not taken.** Always follow the directions on the label prior to usage. Measure the diameter of the well and calculate the weight of the tablets required per thirty (30) meters (one hundred (100) feet) of water using Table 2 (250 mg/l (ppm) solution). Dissolve the required weight of tablets in warm water, remove the well cap, and pour the solution into the well. When the plumbing system is also being disinfected, pump the chlorine solution until a chlorine odor is detected at each faucet or tap. Leave the solution in the well and plumbing system for at least twelve (12) hours. Discharge water from all outlets until the chlorine odor has disappeared.

4.5 The time of contact with the chlorine solution referred to in this subsection shall be at least twelve (12) hours.

TABLE 1

WELL WITHOUT PUMP - LIQUID CHLORINE

Well Diameter mm	Inches	Litres of 5% Bleach per 30 Meters (100 Feet) of Water in Well (for 250 mg/l (ppm) Solution)
100	4	1.5
130	5	2.25
150	6	3.0
200	8	5.0
250	10	8.5
300	12	12.0
610	24	43.5

TABLE 2

DISINFECTION WITH CHLORINE TABLETS OR POWDER

Well Diameter		Grams of 65-70% Chlorine Tablets (for 250 mg/l (pmm) Solution Dry Weight	
mm	Inches	g	Oz
100	4	100	3.5
150	6	282.5	10.0
200	8	425	15.0
250	10	565	20.0
300	12	850	30.0
610	24	3400	120.0

Variable size tablets are the most effective for well chlorination

5.0 SHOCK CHLORINATION:

A procedure known as "Shock Chlorination" is a relatively easy method used to treat water wells that have an iron bacteria or sulphate reducing bacteria problem.

Shock chlorination may not completely solve the problem but through periodic applications, it will reduce iron and sulphate reducing bacteria to a minimum and hold it in check.

5.1 With the shock chlorination procedure, the entire system (from the water-bearing formation, through the well bore and the distribution system) is exposed to water which has a concentration of chlorine strong enough to kill iron and sulphate-reducing bacteria. To be effective, enough chlorine solution must be used to disinfect the entire cased section of the well and the adjacent water-bearing formation. Bacteria collect in the pore spaces of the formation as well as on the casing or screened surface of the well.

Highly chlorinated water can be prepared by dissolving the chemical calcium hypochlorite in water. This chemical is marketed today in granular and tablet form, and contains from 60-65 percent available chlorine. The granular form is recommended because it dissolves quickest. It may be purchased at most chemical supply distributors.

Calcium hypochlorite is recommended rather than household bleaches and other commercial solutions containing weaker concentration of sodium hypochlorite.

The chlorine content in these solutions ranges from 3 to 15 percent, and due to the unstable nature of these compounds, the strength of the chlorine weakens so that at the time of use, they may not contain the labelled amount of available chlorine.

Table 3 illustrates the quantities of calcium hypochlorite to be used based on the characteristics of an individual well.

(From "How to Shock chlorinate Your Well" - pamphlet distributed Alberta Water Well Drilling Association and reprinted with their permission)

5.2 Procedure:

5.2.1 Store enough water to meet household and farm water needs for a **minimum** of 12 hours.

5.2.2 Before disinfecting the water system, remove or bypass any carbon filter in the system. Be sure that the hot water heater's heat source is turned off.

5.2.3 Measure the column of water in the well. Calculate, from Table 3, the volume of water that requires chlorination (for example, a 245 ft. well, 8" diameter, with a non-pumping water level of 45 ft. has a column of water of 200 ft; the volume of water in the well would be 2 x 435 or 870 gallons of water).

5.2.4. Calculate the amount of chlorine that is required and mix it with the water previously measured (in the example, 870 gallons of water should be mixed with 2 x 22 oz. or 44 oz. of chlorine).

5.2.5 Prior to adding the chlorine solution into the well it is much more effective if the well bore, casings and screens can be thoroughly cleaned. In the case of large diameter wells such as bored or dug wells all floating debris should be removed and the casing/cribbing washed or scrubbed. It is extremely important to remove all sludge that has accumulated at the very bottom of any diameter well because bacteria will likely be present. In drilled wells (eg: 5"-6") the pumping equipment would have to be removed before cleaning. After the cleaning the pump could be reinstalled and the well pumped until the water is clear.

5.2.6 Pour the chlorine solution into the well.

5.2.7 Open each hydrant, faucet, etc. in the distribution system, (all appliances that use water such as dishwasher, washing machine, furnace humidifier) until the water at each outlet has a chlorine odour. This will chlorinate the plumbing fixtures. Allow the hot water tank to fill completely.

5.2.8 Leave chlorine mixture in the entire distribution system for a **MINIMUM** of 8 hours (usually overnight).

5.2.9 Chlorinated water should **NEVER** be allowed to drain into the septic tank.

5.2.10 After the **MINIMUM** 8 hours, re-open each hydrant, faucet, etc. in the distribution system, and let it run until the smell of chlorine disappears (generally takes between 2 to 3 hours).

5.2.11 Backwash all filters and softeners and flush the hot water tank.

This procedure for shock chlorination will work for most wells with a bacteria problem. If the water still has a foul odour after chlorination, particularly in the case of sulphate-reducing bacteria, the entire procedure should be repeated as such odor is a sign that not enough chlorine was used.

Note that this procedure will not completely eliminate bacteria from the water system but will hold it in check. Shock chlorination may have to be repeated from time to time, in order to control the problem.

CAUTION: If a well is slow yielding or tends to pump any sediment, go about the shock chlorination procedure very cautiously. Slowly siphon the solution down the well and pump it out very slowly. Over pumping the well may worsen the sediment problem.

TABLE 3

Amount of Chlorine Required to Obtain a Chlorine Concentration of 200 PPM* in a 100 ft. Column of Water

CASING DIAMETER	VOLUME OF WATER NEEDED (Per 100 Ft. of Casing)		CALCIUM HYPOCHLORITE 65% AVAILABLE CHLORINE (Dry Weight**)	
(INCHES)	IMPERIAL (Gallons)	METRIC (Litres)	IMPERIAL (Ounces)	METRIC (Grams)
2	25	125	1.5	40
4	110	500	6	150
6	245	1100	12	350
8	435	2000	22	600
10	680	3000	34	950
12	1000	4500	50	1400 (1.4 kg)
16	1750	7900	85	2500 (2.5 kg)
18	2200	10000	110 (7 lbs)	3000 (3.0 kg)
20	2700	12500	135 (8 lbs)	3800 (3.8 kg)
24	3900	18000	195 (12 lbs)	5500 (5.5 kg)

* This is the recommended minimum chlorine concentration. Depending on the severity of the problem, a stronger concentration may be used.

** Since a dry chemical is being used, it should be mixed with water to form a chlorine solution prior to placing it in the well.

Note that quantities are calculated to provide twice as much chlorinated solution as is needed to clean inside the well; the extra amount is to ensure cleaning of the contaminated formation surrounding the well.

(From "How to Shock chlorinate Your Well" - pamphlet distributed Alberta Water Well Drilling Association and reprinted with their permission)

Help fight the industrialization of agriculture! Help fight factory farms in Alberta!

35. Help Fight the Industrialization of Agriculture!

Factory farming causes problems:

- Water Pollution
  - a 10,000 hog facility creates waste equivalent to 25,000 people
  - sow with a litter can produce untreated waste equivalent to approx. 4.5 people
  - hog farms ("sewerless cities") generate so much surplus manure they can't store it or make use of it safely
  - liquid manure often will leak into drinking water or spill over land spreading bacterial & viral pathogens (pathogens in hog waste are 10-100 times more concentrated than in human waste), parasites, heavy metals, antibiotics, weed seeds, disinfectants, & insecticides
  - high levels of nitrates in water can increase the risk of "blue-baby syndrome, can cause death in infants; is associated with spontaneous abortions in humans; can contribute to algae growth
  - high levels of phosphorus can cause extreme algae growth (1 lb. phosphorus = 500 lbs. algae); depletes oxygen in water; is acutely toxic to fish (may cause pfiesteria ("the cell from hell")
    - … pfiesteria thrives in waterways overloaded with phosphorous & nitrogen, often the result of animal runoff
    - … areas hit the hardest are dominated by factory farms
    - … human contact can result in memory loss, fatigue, dizziness, and asthmatic problems
  - lagoons, which never truly seal, may leak at an average of 500 gallons/ acre/day
- Soil Contamination
  - overapplication of waste onto cropland, affecting waterways and polluting groundwater
  - heavy metals are another serious concern
    - … zinc and copper are added to animal feed to prevent disease and improve digestion
    - … heavy metal buildup in soil stunts plant growth and may poison grazing animals
    - … metal pollution is virtually irreversible
- Air Pollution
  - gaseous emissions (hydrogen sulfide, carbon dioxide, methane, ammonia) have adverse effects on neighbour's quality of life and on physical & mental health
  - damages & alters habitats
  - contributes to greenhouse gases & global climate change

- Human Health Impacts
  - occupational hazards of gases and dust include respiratory problems (asthma, loss of lung capacity, chronic bronchitis, airway obstruction, organic toxic dust syndrome) and death
- Antibiotic Resistance
  - 80% of antibiotics are routinely fed to livestock (to enhance growth & control disease); 20% of antibiotics are used to treat actual illnesses
  - over 40% of the antibiotics sold in the U.S. are used on animals
  - excessive use of antibiotics causes animals to retain strains of antibiotic-resistant bacteria
  - under confined conditions, resistant bacteria is transmitted to other animals
  - transfer of resistant bacteria from animals to humans can occur by ingesting contaminated water, crops, or meat
  - antibiotic resistant bacteria is being found in water near factory farms, soil where manure is applied, meat
  - antibiotics are losing their effectiveness to combat human disease (most at risk are the young, elderly, and those with suppressed immune systems)

- Destruction of Independent Family Farmers
  - factory farms are not responsible stewards of the land (see the soil as a place to dump manure)
  - are causing a decrease in Family Farms
    - … large factory farm producers dominate the market
    - … in the U.S., 10 companies raise 92% of the nation's poultry
  - factory farms are less profitable to communities

- Destruction of Rural Communities
  - corporate factory farms have little or no loyalty or regard for neighbours, the welfare of the communities, the environment
  - corporate factory farms destroy the social fabric of rural communities by the controversy surrounding the introduction of factory farms
- Economics
  - animal factories (also known as "pollution shoppers") target small, isolated communities, communities which have virtually no economic activity except agriculture, have large amounts of cheap water, have environmental laws that are non-existent or loosely enforced
  - animal factories offer, in reality, jobs that are limited, hazardous/high turnover rate, low wage
  - building materials/equipment are bought outside the area
  - feed is bought where it is cheapest (usually outside the area)
  - population declines
  - tourism suffers
  - rise in unemployment and poverty
  - property values decline
  - increase tax burden on the region (environmental costs, infrastructure costs, social costs, resource depletion)

- Groundwater Depletion
  - factory farms use millions of gallons daily (drinking, flushing, cooling)
  - water is often drawn from local aquifers
    … a 7,200 sow farrow to finish uses up 1,130,000 gallons/ day (412,000,000 gallons/year)
- Inhumane Treatment of Animals
  - please refer to www.cetfa.com

Alberta Government recently stated it wants to triple hog production (from 2.8 million in 1995 to 8-10 million in 2005) & double beef production (from 2.5 million cows/steers/yr in 1995 to 5 million in 2005). Alberta Government plays the role of promoter and regulator. Is this not a conflict of interest? Intensive Livestock Operations (factory farms) presently do not have to be registered and specific numbers of operations within Alberta are unknown. Current Code of Practice is outdated and voluntary. It's time for action on this issue!

To do: Attend an evening with Ellen Gould (a WTO and GATS researcher & specialist) On Friday, March 22, at 7:30 p.m. at C.A.W. Edmonton Office, 14931 – 107 Avenue Sponsored by Council of Canadians.
To do: Request the Fact Book and respond to the questions in the workbook provided in an information package available through your local MLA office, on request through the government's toll-free line (310-4455), or online at www.waterforlife.gov.ab.ca.
To do: Plan to attend a meeting for people concerned with the Provincial Government takeover of Confined Feeding Operations in Alberta (April 12, Harvest Center at Westerner Park …Green Building…, South Red Deer). For more detailed information about this meeting or about this information sheet, please contact Elena at 457-3034.

*** Please visit these sites for more information about factory farming.

www.hogwatchmanitoba.org www.factoryfarming.org
www.cetfa.com www.hfa.org www.gracelinks.org

I. History

The information Alberta Environment does not document the history of water management in Alberta. How can we, the public, make an informed decision without knowing the current and historical developments within water management practices, and what are current state of knowledge is? To know where we are going, we must know from where we came.

For instance, does our current political regime know that the North Saskatchewan River was essentially dead due to waste loadings in the 1950's? Or that municipal grant programs in conjunction with new standards in the 1970's improved communities wastewater treatment, hence river water quality, in many river basins. Or that needless water level management projects have cost the province large sums of money for no real benefit (i.e. Buffalo Lake) except for a few politicians. What lessons have been learned from the irrigation and other diversion/storage projects that we can apply to our current situation?

I suggest that an inventory of our historical documents and decisions be cataloged. and summarized to educate politicians and the public.

II. Current Legislation

My opinion is that the Water Act legislation, based in the philosophy of first in time. first in right, must be changed. We have moved beyond this concept; it was correct for its day when Alberta was truly just developing, and we knew we had sufficient water supplies. and didn't have the science to justify another method. However, we have river basins that are over allocated due to the Provinces shortsightedness. Instead of 'diverting watersheds' to fix a problem of our creation, it is more appropriate to adjust the legislation. The issue will be convincing license holders that this is the appropriate method of handling the problem

III. Water Basin Knowledge

The province does NOT have sufficient understanding of its watersheds to issue water diversion licenses. Otherwise, the province wouldn't have over allocated diversions that have destroyed reaches of certain river basins.

I suggest that all the watersheds be scientifically studied and researched. By knowing what areas we must protect and the estimates of water availability, the method of issuing licenses can better protect the environment while permitting **appropriate** development for economic gain. Hopefully, we can avoid destroying watersheds for economic gain.

IV. Diversions

A water diversion to alleviate problems that the province created is NOT an answer. The province must realize it must live within its means, which also means the environment we live in. There are no guarantees on life, so why must we guarantee the quantity of a water supply? Once we start constructing large basin transfers of water, we will only create a short-term boon for a few recipients, and a detriment to future generations.

I suggest that instead of looking at interbasin transfers, that the province promotes development where the water actually exists. We shouldn't have to grow more in the south, when the north still has available water. And, this time we can ensure that the development is controlled to minimize impacts.

V. Water pricing

The general public doesn't realize the costs associated with water use. First water diversions MUST be monitored. When the province understands both groundwater and surface water diversions and if monitoring doesn't decrease use, then the aspect of water pricing must be utilized. Just ensure that by water pricing, we don't create a commodity for NAFTA.

VI. Future Economic Development

There will be a time where the province must decide to reduce or stop specific developments. The world has enough examples of how development negatively impacts the environment, hence, public health. Anytime we compromise the environment, we are merely harming ourselves tomorrow, for a benefit today.

37. Comments on Workbook

In reading the work book, I was dismayed to find how badly it had been designed. I found information that is not accurate. I found statements that are misleading or biased. I found statements that are not clear and straightforward and, therefore, worthless in measuring the public's views.

Instead of answering the questionnaire, I have a provided a point by point analysis of the questionnaire. I judged the statements, questions and options on whether the responses would be

- usable: the responses are capable of being analyzed with reasonable certainty as to what the respondent meant
- valid: the responses will not be influenced by misinformation, misinterpretation, or biases built into the questionnaire
- valuable: the responses will not be significantly limited in scope by the design of the questionnaire.

I found that, out of the 45 statements, questions and options used in the questionnaire, the responses from almost half (22) will not be usable. For another 21 statements, questions and options, the responses will be of questionable validity, limited value and/or doubtful usability. For only 2 questions (#3 and #7) will the responses be usable, valid and valuable.

It is obvious that the people who designed the questionnaire are not skilled in social science research. As a result, I suspect they will not understand the significance of the problems I have identified. If they minimize or deny the problems discussed here, you will need to take the work book and my comments to a specialist in questionnaire design to confirm what I have said.

This analysis considered the information provided in the work book. Some missing information may have been available in the information book that was provided separately or from other sources. However, respondents will rarely use additional information beyond what is provided in a questionnaire. They expect a questionnaire to be professionally designed so that all relevant information is provided in an accurate, understandable form. Also, except for a general reference in the introduction to the potential use of the information book in completing Part b, the work book did not provide references to other sources so that the respondent would know if additional information should have been consulted. Therefore, the validity of the statements must be judged according to what was in the questionnaire, not by what might have been available from another source.

Part a: Challenges

1. a. "Water will become an increasingly scarce resource in Alberta"

   As written, this statement means the natural water supply will decline. Since there is already a statement on climate change, a declining natural water supply should not be what was meant. Instead, this statement appears to be intended to measure views on whether competition for water will increase. If that is true, the responses to the statement will not be usable.

   b. "Access to safe drinking water will become a significant issue for Albertans"

   The statement mixes two themes. As written, it deals with access which is a question of being able to afford to build, operate, maintain and replace the necessary facilities. The other theme on whether drinking water supply will be safe is not actually being measured, though some respondents will respond as if it is. The responses will not be usable.

c. "Water availability will limit growth in Alberta"

Water availability can mean one of two things. It can either mean the water is available at the source (raw water) or it can mean that the necessary facilities are in place to withdraw, treat and distribute the water to customers. They are two very different things. This statement could mean either. The responses will not be usable.

d. "Climate change will seriously affect water flows in Alberta"

Climate change does not directly affect water flows except in a minor way through evaporation. The statement should have referred to other factors such as the impact of climate change on precipitation, snowpack and glaciers. The statement also does not specify whether the flow will increase (as in flooding) or decrease (as in drought). Since the causal relationships are not clear, the responses will not be usable.

e. "Industrial and agricultural growth will create greater demands for water – not always in places where water is plentiful"

This statement is muddled by too many themes. First, it lumps industrial and agricultural growth together. Second, it lumps agricultural processing with primary production. Third, it lumps "industrial" primary agricultural production (e.g., hog and chicken "factories") with traditional farming and ranching. Fourth, it does not separate the water quality demands from the water supply demands. Fifth, it mixes growth as an issue with the issue of where the growth will occur. It also uses the word "plentiful" when the real issue is places where shortages will occur. The responses will not be usable.

f. "Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth"

"Sustainability" is a buzzword subject to many different interpretations. The statement is meaningless without a clear definition of what is meant by sustainability. The statement is also poorly worded so that the respondent can not tell if it means "economic growth" or "the sustainability ... of economic growth." The responses will not be usable.

g. "Surface water and groundwater will be vulnerable to pollution and contamination"

Vulnerability is not the issue. Water is always vulnerable to contamination. The issue is whether water will be contaminated or the regulatory system will be adequate. "Polluted" and "contaminated" mean the same thing, yet the statement implies that they are different which may confuse some respondents. The responses will not be usable.

h. "Flooding will pose a threat to human safety and create potential damage and economic costs"

Very poorly worded. The issues are not

- "a threat to human safety" but injury and loss of life
- "potential damage and economic costs" but "damage and economic costs".

The responses will not be usable.

i. "Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important"

Two very different themes are mixed here: "water systems" and wise use of water. The term "water systems" is also ambiguous. Does it mean natural water systems or man-made water systems? The responses will not be usable.

j. "Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure"

Two very different themes are mixed here. The use of the words "effective" and "dams" will raise the issue of whether dams are effective water management – a very emotional issue. This is intermingled with the theme of investment. "Infrastructure" is not plain English. "Investment" is also an ambiguous and potentially loaded term. The statement is not clear as to whether the only type of infrastructure under consideration is infrastructure that provides a net economic return. Operating and re-building facilities are also not mentioned. The responses will not be usable.

In addition to the lack of clarity in the way these challenges were worded, they are sanitized and play more on people's fears rather than their ability to make rational choices. The statements appear to have been developed by people who have a limited and simplistic view of water use and have not kept pace with developments in modern water management. Key aspects not dealt with in the challenges are:

- Financing the infrastructure and subsidizing the weaker elements in society, e.g., irrigation farmers and small towns and villages.
- The ability to gather and use scientifically credible data.
- Controlling development in floodplains.
- The shift in political power and the change in rural communities that will come from increasing use of water by urban areas and industry.
- The behavioral changes that will be needed for water conservation.
- The shift from engineering-based water management (high-handed, top-down and special interest) to community-based water management (cooperative, grassroots and broadly-based).
- The value and role of regulatory measures.
- The value, role and feasibility of educational measures.
- The ability to assess and manage risk.
- The problems and limits of treating wastewater – both point and non-point.

2. "Of these challenges, please indicate the three most important for the Government of Alberta to address:"

Since 9 out of the 10 challenges are not usable, then the responses to this question will not be usable.

4. "Do you agree these objectives should guide Alberta's water strategy?"

Objectives

"Healthy, sustainable ecosystems (e.g. watersheds, rivers, streams, lakes, wetlands and groundwater)"

- "Sustainable" is meaningless without a definition. A response will not be usable unless the respondent provides a definition of sustainable.

"A safe, secure drinking water supply"

- The meaning of the word "secure" is unclear. Does it apply to water quality or water supply or both? Does it mean armed guards around treatment plants to keep out terrorists? Does it mean a healthy watershed? Does it mean no shortages of water? A response will not be usable unless the respondent provides clarification on these issues.

"Reliable, quality water supplies for a sustainable economy."

- "Sustainable" is meaningless without a definition.
- What does "quality" mean? Does it mean the quality of the water? If so, does it mean high quality? Low quality? Or something in between?
- A response will not be usable unless the respondent provides clarification on these issues.

The responses to question 4 will not be usable unless respondents provide clarification.

Part b: Drinking Water

5. "Do you get your water from your own private system?"

"Private system" is not clearly defined. Does this mean a water supply for a single house? A cooperative? Or a privately owned communal system? The responses will not be usable.

6. "... the safety of private water supplies can not be guaranteed."

This is extremely misleading since health authorities are responsible for guaranteeing the safety of drinking water.

(1st option) "Monitor the quality and safety of the water supply for private water systems"

The difference between "quality" and "safety" is not clear. The "implications to consider" are biased since no advantages of the option are mentioned. The responses will have questionable validity.

(2nd option) "Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences"

Water co-ops rarely serve more than the local area. They are seldom "regional". Limiting the statement to co-ops limits the value of a response since federal, provincial and municipal governments and water companies can also provide rural water systems. The statement only applies to the provision of untreated water which limits the value of the statement even further. The "implications to consider" are biased since no advantages are mentioned. The responses will be of limited value and questionable validity.

(3rd option) "Develop individual water supplies (e.g. well drilling, dugout construction, water hauling)"

The "implications to consider" are biased since no advantages are mentioned or cost comparisons provided. The responses will be of questionable validity.

(4th option) "Pump water from distant sources to dugouts during times of drought"

The statement is biased because most pumping to dugouts does not require distant sources. As well, it only deals with crisis management (after a drought has arrived) rather than a pumping program that provides drought-proofing. The "implications to consider" are biased since no advantages are mentioned. The implications are also badly written because it creates an apparent trade-off between "the new water source" and "another source ... within reasonable distance". The responses will be of limited value and questionable validity.

8. The options listed under this question can not be accurately answered since the background information does not clearly identify who is already responsible for the activities mentioned (including paying the costs) and how well they are doing their jobs. Note that the background information deals with the municipal role in building treatment facilities, but the options deal with operations, maintenance, monitoring and provision of regional systems. The term "municipal" has a specific meaning that goes beyond what municipalities do and includes systems owned and operated by private companies and others. This greatly limits the value and validity of responses.

9. "Do you think companies (public or private) should be allowed to invest in water systems and provide drinking water to small municipalities?"

   The use of the term "public" is not clear. Does it mean Crown corporations or publicly-held companies? This lack of clarity limits the usability of responses.

10. **Reliable, quality water supplies for a sustainable economy**

(1st option) "Determine groundwater availability throughout the province."

"Availability" needs definition. Is the groundwater just there? Or is it feasible to drill and extract the water? Does this include the quality of the water? The use of the term "throughout the province" is unfortunate since some respondents will reject a program that investigates groundwater where there is little competition for groundwater or other options are readily available. The "considerations" are misleading since "detailed information" implies data sufficient to determine the location and sustainable yield of aquifers. That type of detailed information is not available in virtually the entire Province. The responses will be of limited value and usability.

(2nd option) "Allocate all available water by 'first in time/first in right' rule, then prohibit any further allocation of water in the basin"

What does "available" mean? Does it mean available in the stream or after facilities have been constructed? Does it mean that aquatic needs have been met? The "considerations" do a disservice to the respondent since the word "potential" means that the ecosystem may or may not be protected. The "considerations" are also biased in using the words "no allowance" for the future since measures like transfers and water conservation will come into play. The responses will be of questionable validity.

(3rd option) "Allocate water based on its most beneficial, or valued, uses"

> The responses to this statement will be meaningless since the respondent was not asked to identify the most beneficial uses.

(4th option) "Allocate to further uses even if this potentially harms aquatic environments"

> This statement is very badly worded. The term "further uses" means new uses not already occurring when the statement should have simply said "Allocate more water even..." More importantly, the use of the word "potentially" eliminates any meaningful response. There will either be harm or there will not. Leaving it ambiguous leaves the results open to interpretation. The use of the plural "aquatic environments" does not add meaning and leaves the statement open to additional misinterpretation. The "considerations" are biased since no advantages are mentioned. The responses will not be usable.

(5th option) "Set aside water for future population growth before there are any shortages"

> Shortages are already a fact of life in southern Alberta, as noted in the introduction to this section. This option, therefore, does not apply to that part of the Province. The "considerations" are also very misleading since, if proper planning and management occurs, current generations may not have any limitations on water availability. The responses will be of limited value.

(6th option) "Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)"

> This statement is not clear since it does not make a distinction between water that is not used due to inaction, speculation, or waste vs. water that is no longer needed due to conservation measures. The results will be meaningless. Unless the government has been misleading people, the "considerations" are wrong since transfers have supposedly never been used in Alberta. The responses will not be usable.

(7th option) "Encourage more efficient use of water through pricing to reduce overall use"

> The overall impact of pricing has not been measured with this statement since it has limited the issue to pricing specifically designed "to reduce overall use". The "considerations" are wrong since in many instances the value of water does not necessarily mean "more economic benefits". Examples are the value of a guaranteed (no deficit) supply, "zero tolerance" of contaminants in drinking water, water used for recreation or aesthetic purposes and water provided to support rural communities. The "considerations" are also biased since no disadvantages are mentioned. The responses will be of questionable validity and limited value.

(8th option) "Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations"

> The statement is misleading since the real issue (as implied in the "considerations") is whether reservoirs should be built, not whether they should be investigated. The statement is limited to water for new operations, not existing operations or the aquatic environment. The responses will be of limited value and not usable.

(9th & 10th options) "Investigate construction ..."

These options will provide a biased response on inter-basin transfer since, unlike the other options, they are quite specific. Inter-basin transfers are very controversial, so without a general "safety valve" question on inter-basin transfers the responses will be skewed by those who have strong feelings on one side of the issue or the other. The "considerations" are biased since no advantages are mentioned. The "considerations" for the eighth option are also misleading since the option will have ecological consequences due to wastewater ending up in a different basin. The responses will be of limited value and questionable validity.

(11th option) "Companies pay for and build their own water storage so they can 'bank' water in high flow periods and use the water during low flow periods"

The statement is misleadingly narrow. Municipalities, irrigators, households and others can (and do) build their own storage. The "considerations" are biased. They only identify disadvantages of the option and misrepresent them since more storage could reduce the risk to other users. The responses will be of limited value and questionable validity.

11. Water conservation

(1st option) "Establish a price for water used by industrial and agricultural operations"

The statement has mixed industrial and agricultural options. In general, industry can afford to pay much more for water than farmers and ranchers. Farmers and ranchers may not be able to pay any price for the water they use. To many industries, a price for water may not even be significant. Respondents will interpret the statement differently, but how they interpret the statement will not be known.

Although the "considerations" make indirect reference, the statement does not differentiate between a user fee and a tax on water. This is a crucial distinction that needed to be made to make the responses accurate and reliable.

The "considerations" are biased. Only a positive aspect of pricing is mentioned and it is an exaggeration since pricing does not always encourage people to use the "product" wisely. The user may not act any differently because either he is indifferent to the price charged or he is already using water as wisely as he can.

The responses will not be usable.

(2nd option) "Establish a price for water used by individual households"

The "considerations" and the statement are not compatible. This will lead to confusion and misinterpretation by the respondents and the people analyzing the results. The statement refers to any household whether it is on a municipal system or not. The "considerations", however, are limited to water supplied by municipalities, usually cities, towns and villages, not rural municipalities. The statement does not differentiate between a user fee and a tax on water. The "considerations" appear to make the distinction, but do not clarify which type of pricing is being considered. The responses will not be usable.

(3rd option) "Educate Albertans about water conservation values and methods"

The term "water conservation values" is unclear. It appears to mix a neutral public service initiative on education with a "crusade" to make people do the right thing. The "considerations" appear to support the second interpretation with its reference to creating "a water ethic shared by all water users". In the analysis, it will not be possible to sort out what people were responding to. The responses will not be usable.

(4th option) "Establish water conservation incentives (e.g. tax rebates) offered by government"

The statement is clear but the "considerations" are murky. Are they only the negative but not the positive aspects of the issue? Given that the government will establish the incentives, why is "may" used, that is, what might relieve the government of that cost? Or is the "may" referring to some sort of cost-benefit comparison where the government's costs are somehow re-couped? The responses will be of questionable validity.

(5th option) "Set targets for water conservation for various sectors using best management practices"

The statement should have identified whether the targets would be voluntary or mandatory and whether they would be tied to incentives or disincentives. Without this type of clarification, the responses will be of questionable validity and limited value.

12. **Safeguarding Alberta's healthy ecosystems**

The introductory phrase "Considering our water resources will be facing increased pressures in the coming years" will antagonize those people who disagree with statement 1.e. and, possibly, 1.a. This will bias responses.

(1st option) "Determine how much water the aquatic environment requires to remain healthy"

The term "natural demand" in the "considerations" is not defined and may confuse respondents and bias results. The "considerations" are also biased since no disadvantages are mentioned. The responses will be of questionable validity.

(2nd option) "Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a basin"

The statement and the "considerations" are in conflict. The statement mentions what is needed (scientific information) while the "considerations" mention values (the choices people make). This may muddy the water for respondents and make the results uncertain. The responses will be of questionable validity and limited value.

(3rd option) "Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm"

The use of the word "accept" is a euphemism that will antagonize some and not be clear to others. As well, there are different types of "acceptance", those substances that will eventually be rendered harmless through biological processes and those that can only accumulate within the system until an unacceptable level is reached. The "considerations" are biased since no advantages are mentioned. The responses will not be usable.

(4th option) "Identify sensitive aquatic environments or habitats that require additional protection"

"Sensitive" can have different meanings, e.g., the environment is sensitive to particular contaminants, the environment is sensitive because it is already under stress, or the environment is overly sensitive and, therefore, not tough enough to be worth protecting. The statement also deals only with "sensitive" environments. In the mind of a respondent, "non-sensitive" environments may also require additional protection which may result in a response of disagreement. The "considerations" are nonsensical. As written, it means that the information on sensitive environments will allow decisions to be made that put the aquatic environment at risk. The responses will not be usable.

(5th option) "Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management"

The statement has left out the most important options, that is, integration with water use and wastewater disposal but will probably be interpreted by some respondents as if those factors are under consideration. It is not clear how watershed management is different from land use management and why, in the "considerations", land use is not considered to be an activity. The responses will not be usable.

(6th option) "Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use"

The responses will be biased because only negative implications are mentioned – and speculative implications at that. The responses will be of questionable validity.

38. Additional Comments on Water for Life Survey

ADDITIONAL COMMENTS ON WATER FOR LIFE SURVEY

Some of the assumptions underlying this survey should be revisited:

a) The third objective on page 3 seems particularly skewed. The writers appear to suggest that society needs to change the water supply, rather than how we use it. We must live within our ecological means, not try to redesign our ecosystem.

b) Growth may not be the Holy Grail the writers appear to believe it is. The idea that growth of population and industry is the only route to prosperity should be revisited. We need to consider the ecological and societal costs associated with untrammeled growth, and to develop other options. Different kinds of industry with fewer adverse effects, and less reliance on a constantly growing population.

c) Societal decisions should be made by citizens for citizens, not by corporations for corporations. Assuming that this survey will be used as a basis for policy change, probably with the preamble of "This is what the people of Alberta want…", then this survey should be completed by private individuals not companies or corporations. It also seems entirely inappropriate to encourage "double dipping" by suggesting that individuals also respond on behalf of their companies.

d) The idea that water should be allocated to the most valued use, if this means most highly valued in monetary terms, is a particularly bankrupt concept. If this were the case, the oil and gas industry would be deemed to have priority access at the expense of all other users. Is Alberta being managed for citizens or for transnational corporations?

e) A clear demarcation should be made between citizens and small business on one hand, and corporate interests on the other. It is misleading to lump intensive livestock operations owned by corporations in with the family farm or ranch.

f) Existing water rights, which have been bought by citizens must not be taken away. Land is nothing without water. Investments of a lifetime, perhaps generations, would be lost if the right to water were to be taken away. Perhaps the writers should reconsider the implied notion that water rights could be taken away should enough respondents from other sectors think that might be a good idea.

g) The Government of Alberta is responsible for maintaining a healthy environment for current and future generations. The results of this survey, whatever they might be, would not exempt Alberta from that responsibility. Giving respondents the option to choose to "allocate water…even if this potential harms…the environment", for example, is an irresponsible option.

Why was this exercise - the meetings, this survey and the resulting policy changes - done so suddenly? What has happened to the watershed plans processes already underway?

water for life

record of community workshop discussions: by workshop location

Sub-report No. 2
section a

May 2002

This summary of the community workshop discussions is presented in the order of the workshops as they occurred. At the community workshops, time did not allow for discussion of all topics in the workbook at each meeting.

It should be noted that the comments provided were often the result of small group discussions, with a table "reporter" providing a summary of the discussion at the table.

Community workshops were held between March 6 and April 11, 2002, on the dates and at the locations indicated below:

March 6	Stettler
March 7	Hanna
March 11	Lethbridge
March 12	Calgary
March 14	Westlock
March 18	Medicine Hat
March 20	Edmonton
March 21	Rocky Mountain House
March 25	St. Paul
March 26	Fort McMurray
April 2	Grande Prairie
April 3	Peace River
April 4	High Prairie
April 9	Calgary
April 11	Red Deer

Stettler: March 6

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Water will be a scarce resource, due to population and livestock densities. Also due to oil field fresh water injection.

Will be a long time from now. Go north - you can't go south: Peace River, Mackenzie. We'll never be short of water but we may mismanage it. A feed operator will pump out of his own aquifer on his own property. Don't think we'll be short. Mismanagement starts in the City. Feed operators won't make much difference.

Water is like land - value depends on location. Demand creates value. There are going to be more people living in this province. We've got to look at location. The Mackenzie isn't going to do us much good in the south. 10% of the water used in Alberta is being injected - that water is gone forever - I doubt it ever comes back into circulation. Criminal to allow fresh water injection.

Agree totally. Water is not something you can come up with wherever you happen to be. Don't put any potable water down injection wells. In other parts of the world many do not have potable water. Water is our most prized possession. We have to manage it well. If we don't, we'll take the full blame in the future.

c. Water availability will limit growth in Alberta

Agriculture and industry are at a point where they cannot expand due to a lack of groundwater. It's very difficult to get an allotment from the Red Deer River.

In our area (east) we (farmers) are losing ground. We are really limited and water is a major factor. This is a current issue - not the future.

Doesn't the population growth influence decisions on these questions? More population increases demand for water. It takes water away from other uses.

Have to look at the most effective use of water in a particular area. The drier southern part of the province - where water is not used as efficiently as possible in some irrigations projects. Water could be transferred to other areas of province.

d. Climate change will seriously affect water flows in Alberta

We agree. Climate change works in a cycle. We've had both droughts and wet periods in the past. "Seriously" is a pretty strong statement. It will have an affect but we're not sure how seriously. Contingency plans need to be in place - designing a system is an option but an expensive option. Properly managed water plans.

Surface water flows: Province can react to and plan for but re focussing resources can't do much to control. Plan, prepare but not a resource allocation issue.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Confrontational wording.

We'd like to see both happen. However, when water becomes scarce - the fish and toads are going to die. Livelihood comes first. But we also believe ecosystems are important.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Already is a problem and has been for some time. Oil companies drilling through various layers of groundwater allows contaminants to permeate through the soil and good and bad water can mix.

Water injection wells - mostly in the northern part of the province - but are province-wide and could cause contamination.

Airborne contaminants may also be important.

Extensive use of nitrogen and phosphate fertilizers that are not properly infiltrated or improperly used are a concern.

Every quarter section in the province has 24" wells drilled by homesteaders in order to get government grants for "improving" the land. They then sold the homestead and left. These wells are a concern as they can get polluted and can also be a hazard to human safety.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Yes, flooding poses a threat but don't know whose fault it is. Should government be responsible? Education would be one way of solving problem. Buffalo Lake - dry areas can flood. People need to understand where the water could come in certain situations. Do some advance planning where people might be affected (flood plains).

Need to have some laws or controls in place such as not allowing a hog farm in a flood plain (contamination).

A lot of flooding has been caused by removal of forest. Majority of land west of Highway 2 is not good for agricultural use (forest cover and frost) - it's a recharge area for our aquifers. Aquifers are not what they were in pioneer days.

People encroach on riparian areas: learn how to avoid problem.

Flooding is preventable. Land cover - wetlands and riparian management should be part of a management plan.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

High importance. Strongly Agree. Water conservation will not necessarily happen until people are informed about water resources (e.g. City of Calgary, Glenmore Reservoir - don't have meters - cost to processing). Where water is abundant at this time it may not be perceived as a problem. High volume users should use water wisely. Government has limited resources: anything we do in water conservation competes with other issues such as health, education. If there's no perception of water shortage in the cities, it will not be supported.

question 3: are there additional challenges?

Q. What percentage of Alberta's portion of the river systems flow is already allocated in Alberta? Is the Red Deer River already over-allocated? A. Very small percentages of northern rivers are allocated at this time. In southern rivers (each year varies) - we owe 50% to Saskatchewan - our allocation approximately equals our share to be allocated.

Q. Our allocation is used up before the water gets to Empress? A. Yes.

"Used" and "allocated" are different terms. The amounts used varies, whereas the allocation is set.

Q. Allocation in southern part of province: Is Red Deer River basin making up for overuse in southern Alberta? A. Don't have complete information on that yet. Currently trying to tabulate numbers (potentially true).

question 5: where do you get your water?

Private 24	Small Municipal 1

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

Owner should be responsible. Use common sense to avoid contamination. If an oil company pollutes your water - you can't be held responsible. Average person doesn't have qualifications to test.

You should have to check to make sure someone has not contaminated supply.

Private water is in the vast minority. Large majority have to help. At best, it should be a shared responsibility. Individuals cannot be own authors of water supply. Local government should play a role.

Those on public water systems pay dearly. I don't want any interference on private systems.

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

Co-ops are private systems.

Related to water source. Private systems could contaminate other users. Similarly, oil wells can contaminate. Private systems can be threatened by other users (based on location).

Water testing is paid for by users of facility (same as public system).

Q. Why is the term "untreated" water used? A. Many co-ops in province provide untreated water.

What guidelines would be used for this water? Who sets them? I believe it should be a shared responsibility.

question 8: small municipal systems ... whose responsibility is it to ...?

a. supply technical advice to small municipalities about facility operations, maintenance and monitoring

Currently municipality's responsibility. Alberta has strict requirements compared to other parts of Canada. The cost should be borne by members of community. Disadvantages: good supply and treatment attracts industry. Government encourages regional systems - they then can incorporate you whether you wish it or not. Education of municipal staff costs money and has to be charged back to users or taxpayers. With smaller urban municipalities, government pays 75% of upgrading (capital costs). The capital costs can sometimes be higher than own system. Lose options/possibilities.

Pay close attention to Ontario's enquiry results (for guidance).

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Disagree. A difficult question - how you deal with existing rights.

NWT Act - CP Rail got rights to significant allocations in southern Alberta.

FITFIR doesn't encourage effective, efficient use of the resource. Need to encourage efficient use.

FITFIR must have the right otherwise you are in effect confiscating property.

e. Set aside water for future population growth before there are any shortages

Some issues with urban vs. rural. Consumptive use is 4.5% compared to 71% for irrigation. Calgary (largest city) - allocation for rural is 45 x the City's allocation. Has to be looked at in perspective. Future population +growth: it does make sense but is a pretty small component of use in the province.

Allocation and use: Q. Are there priorities when water is rationed? Would the whole Water Act need to be changed? A. There is no priority for municipal use - only for household purposes of those who live over the water.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

No.

g. Encourage more efficient use of water through pricing to reduce overall use

No. Charging for water may help conservation. But for operations such as the cattle industry, no matter what the price, there will still be a demand - won't necessarily create efficiency. Wording of statement is too broad. Meters on farms not a popular idea.

Q. Doesn't the Water Act prohibit the sale of water? A. That is correct - any change would require a change to the Act.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

No inter-basin transfers. Concern is that effects are not known on ecosystems (from and to). Big risk to take.

Raw water needs to be investigated separately from treated water. For instance, not dealing with pathogens with treated water.

Q. If we did transfer north to south, how does that affect the free trade agreement? Would we have to supply to the U.S. also? A. Information right now is that it is still within our jurisdiction.

No need to transfer water right now. Cheaper to move north. If the U.S. wants it, they'll come and get it. If we want their produce, we should maybe give them some water.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Agree - farmers do so already.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

Reasonable philosophy.

Buffalo Lake Stabilization - has taken this approach. If we don't take approach we will have much less water to work with in the future. Cleaning up pollutants must be tackled. Need a good flow of water to accomplish this.

Need to find out what the base needs are for water so that these systems function in a healthy manner. How is difficult but the need is there so that use over and above can be managed.

Buffalo Lake: It cost a lot of money to pump the water over there. The lake level is being maintained artificially. In the old days, they had hay at the bottom of the lake (1915-1917). Many areas in this country were desert.

Emphasizes need to determine base needs and recognize variability that exists within these systems. We must manage within that range. Some systems don't always have water every year and therefore perhaps shouldn't (in the management plan).

additional comments: about water issues

Human management vs. resource management. We need to look at limitations of ourselves in relation to resource.

Costs: the most expensive glass of water is one from your own well.

The water we're drinking today is the same the dinosaurs wallowed in. Have a problem with fresh potable water being stored in the ground (injection) with no way to get it back. We have to manage the resource or we will suffer.

additional comments: about water strategy process

Q. What is process now? A. 12 meetings, each run the same way. Won't get through all questions but will get a sampling from around the province. Will record comments at meetings. Tabulate workbooks. Report will document all. A random telephone survey will also be undertaken asking some of these same questions. Will be reported to Minister of Environment. Minister will host forum to look at results. Will talk about what to do about it.

Announcement of meeting was poorly done. Not enough notice or advertisement. Rushing through within one month. Hope it improves. Should have contacted a few people such as Jim Fisher (agricultural show). A. (Anne) We are talking with him.

Calving season. Poor time for meetings.

Hanna: March 7

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

A number of considerations: Is there going to be less water vs. water use? There is some evidence that there is less water. Is this a blip on the map or are we going into a longer cycle? There is increasing population creating increased demand with maybe less water to go around but how much of that is recycled? - most is put back into the system but it may not be available at the right time or place. Increasing demand from industry will likely create some shortages, particularly in years of drought. Agree that water will be increasingly scarce due to increasing demand.

b. Access to safe drinking water will become a significant issue for Albertans

Drinking water is a priority for use. Because it affects everyone, any fixes required to be made by the provincial government would have wide support.

Minister could declare a state of emergency if required. He could direct the water to anyone he chose at that time. There are no guidelines for compensation.

Q. Has there ever been a situation where municipalities were shut off and people had no water? A. No.

Agree - especially on farms.

c. Water availability will limit growth in Alberta

Yes and no. It will be a factor in where growth will take place. Heavy water use needs to be near water. Industry may choose to go north where there is more water. Availability will steer growth and affect growth with respect to location.

d. Climate change will seriously affect water flows in Alberta

There's still enough uncertainty about global warming to make it difficult to say whether it's an issue or not

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Obvious greater demand.

If the licensing system is working appropriately in Alberta, that could not happen. Diversion of water - don't have a clear understanding of how that works. Comment (AE): Licensing process assesses if enough water is available for the application. Would there be continued demand whether or not there is enough available water? Junior licenses are cut off sometimes if flow is not sufficient. Flow varies every year. That's why priority system works.

What's the advantage of licensing wells in 2002? A. Surface water is a lot more variable. Ground water levels change very slowly. We monitor water tables.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

No. Shouldn't have to choose. Water could be managed better. Why not treat the water used for oil and gas injection so it can be reused. With more efficient use of water and regulating - should be enough water.

Some feel taking any water affects the ecosystem. We have to choose the point we can live with. Diverse opinions on that.

Not comfortable with wording. Implies there is already not enough water. Don't feel it's an issue as yet.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Already is vulnerable to both. We don't make the link between contamination and how water and land is managed. Intuitively we understand the connection but not with decision making.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Flooding will not pose a threat in our area.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Have to have knowledge to make informed decisions. Agree.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Agree. Dams, weirs have to be in place to manage water. There are also environmental concerns involved.

question 3: are there additional challenges?

Agriculture should be the top priority for government. What about limiting urban growth?

question 5: where do you get your water?

Private 19	Small Municipal 0

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

Shared: Private citizen is responsible but to get water tested is expensive. Can we get testing compliments of the government?

Owner's responsibility.

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

User pay.

c. Develop individual water supplies (e.g. well drilling, dugout construction, water hauling)

User pay.

d. Pump water from distant sources to dugouts during times of drought

Define "drought" (different levels perceived in different areas). We need to plan before drought comes. Can't ask government to bail us out of everything.

Some things are out of our control. Can't drought-proof for every circumstance. Government should provide some support in those instances.

question 8: small municipal systems ... whose responsibility is it to ...?

a. supply technical advice to small municipalities about facility operations, maintenance and monitoring

All of us are responsible to make sure every Albertan has the benefit of the expertise required to supply safe water.

c. Develop regional water supply systems

Joint responsibility. If community is willing, government should partner with them to help it happen.

If Edmonton received provincial grants to develop their system, why can't another community apply? If Hanna needs assistance they should have provincial funds available too.

The bottled water people purchase - there are no standards on that.

Bottled water: there are lots of hoops to jump through with the Health Department and Customs Excise and Measurement. It's mandatory to send in water samples every two weeks - province pays for them. Labels have to be specific: spring, reverse osmosis, or distilled.

Availability of bottled water much more evident. Trendy but not indicative of water quality available.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

In time of drought perhaps we should share the resource with everyone.

What happens to young people who need to set up an irrigation? If we sell allotments - industry will come in and snap them up.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Don't agree. What happens if license owner doesn't even live there anymore - should he be able to hold everyone to ransom?

Q. Is it even possible - legal? A. Currently if sell land license is lost.

Already doing it on a yearly or bi-yearly basis. It should be allowed.

Agree for instance during a drought situation. Only allowed on a need basis - conditional.

Ability to transfer allocation is one method of individuals who have large allocation spreading it out to other users.

If it goes to highest bidder - is it possible it would move out of agriculture? Concerned about where it goes. Does it work against sustainable agriculture?

Water transfers have to happen. When fully allocated it becomes only option unless you put in infrastructure (or both). Downfalls are using water that isn't currently used (more water used); richer markets will pick up option perhaps taking away from original use.

Be careful not to sell water to California - should stay within water basin.

In areas where water is fully allocated, without a transfer allocation, the government would have to reallocate the rescurce. As long as an individual is not compelled to transfer his allocation, transfers would prevent government from having to step in and solve the problem.

g. Encourage more efficient use of water through pricing to reduce overall use

Water is paid for now in the cities (metering vs. flat rate). As far as agriculture and industry, the only purpose would be to bring about more efficiency. There's probably a lot of waste now - more used than necessary. Perhaps put in an efficient system and charge a flat rate. There is a price attached to all water regardless.

Need to develop a conservation ethic. Pricing water is a narrow focus. Have to be careful that we don't end up causing harm to something else to achieve our ends. Pricing sounds like tax - once implemented will just get bigger. May eventually work against agriculture. Currently try not to pump more than we need to but enough to get a good crop. This measure may affect this.

Taxes create money - not necessarily water. Making systems more efficient may be the way to go. Complex issue. Price not always an instigator of efficiency.

F7

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Depends - if you're on the receiving end, it's a good thing. In an area like this, we don't think it's a good thing to send water to other areas. Investigate it, sure - but proceed cautiously.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Agree. Same as agriculture (irrigation districts).

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

Federal and Province are working on endangered species Act. Will impact this strategy greatly.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

The basin (watershed) approach with broad representation from all sectors provides the best planning. We've found we can often adapt to accommodate others' needs.

What impact does a water basin plan have on NRCB, petroleum industry, municipalities - who uses this plan? A. Approved plans must be considered by decision makers. Under NRCB it isn't legally required. However, decision makers want to have guidelines and will refer to a plan that has been developed by a stakeholder group.

additional comments: about water issues

Oil industry - water injection. Can they use something else such as effluent (waste water) vs. good water for human use?

In some areas, they use dyes to find out information and it can be back up within a week (contaminated). How much of this water is actually reused? They separate it in settling ponds, put some back down. Contaminated water is pumped down disposal wells. Why can't all water be brought to surface, settled, skimmed off and reused? They are concerned with wildlife getting to the contaminated water. Cheaper to leave it where it is.

Registered wells, dug outs, surface water - how do you find out if there is any pre-register of that water on the land? Your title carries with it the licensing. No registrations prior to this year.

For wells that produce potable water - can it be used for livestock instead of being put down an injection well?

Q. What do you do with licenses that are not being used? A. Provision to cancel all or part of licenses not being used. We test to see if they are being used or if there are no plans for use of the water.

A. If a license was issued in 1938 and reissued - does it have the same priority. A. No. priority is lost. That's why it's wise to transfer rather than lose the right to the water.

Q. Who sets the price for water allocation transfers? A. Market.

Lethbridge: March 11

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Definitely a problem in southern Alberta right now. We could see it becoming a concern if there is overpopulation, we could see possibly limiting industry. This is a semi arid area where water is a limited resource. Priorities have to be put on the use of water. Allocation of water resources should not be left up to government. Individuals should decide on use.

Both industry and farmers need to become educated regarding efficient use of water. Efficient use would create the potential for more growth within our basins.

We have a problem in southern Alberta but northern Alberta does not.

Although northern Alberta does not have a problem with volume of water, they do have a problem with quality consumption water.

Water needs to be diverted from up north to the south.

In this semi-arid area, water is very tight for agricultural use (crops). However, other areas have different shortages/problems.

b. Access to safe drinking water will become a significant issue for Albertans

Safe drinking water is already a problem. It's often taken for granted that it's safe for consumption. More and more people are buying bottled water rather than drinking tap water. Our groundwater is already contaminated (pesticides, etc.). Industry has an effect on our water. Effluents released into rivers also contaminate water. How safe is our drinking water? No situation in Alberta yet such as Walkerton, but concern has been raised.

Can we compare ourselves to Walkerton? It was obviously mismanaged.

Citing Walkerton is fear-mongering - Environment has fairly good controls over drinking water. If everybody does their job well - we won't have a problem.

Well water + human error caused the problem in Walkerton. Good treatment and competent people will overcome that.

Public has to be educated with respect to risk assessment. Decision makers and infrastructure workers and the public all have to be well informed.

Farmers take water from dugouts - we're responsible for our own water. In cities, no one takes responsibility. Individuals could get their own water checked if they are worried.

c. Water availability will limit growth in Alberta

In the long term, yes. But for the short term, we still have room to develop if we use water more efficiently. Limitations may be based on where industry may locate.

d. Climate change will seriously affect water flows in Alberta

Not sure whether climate change is actually an issue. If it is true, it will definitely affect water flows.

We should use the precautionary principle. Even if you're not sure whether climate change is real, it doesn't mean you shouldn't act on the possibility. By planning for the possibility, even if there is no climate change, we would be further ahead.

Our opinions may be irrelevant. Kyoto proposal - we may have to comply whether we like it or not.

Climate change models indicate precipitation will be reduced in the future.

Biased question - who wrote the question?

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Yes, but will also create a greater demand for efficiency. If you reduced consumption by 50% you could increase growth.

The crops we grow (cattle, sugar, potatoes) are high demand for water crops.

You have to consider production relative to consumption (input is high, but output is also extremely high).

We should limit industrial and agricultural growth in areas where there is less water.

Need to look at education of city populations. The use of water for the beautification of cities should be part of the equation also.

Albuquerque was able to reduce their residential consumption - industry used up the allocation (Intel).

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Can go together - irrigation systems and canals can protect ecosystem. Disagree with statement. Don't need to choose between the two.

Need a balance between the two.

You will need to make a choice; people are already making choices. If there's a change in the future, you will have to decide in which direction you wish to go.

Every drop we take out has a negative impact on the aquatic ecosystem. If we do it - we need to determine where the balance is. Ecosystems evolve and function within a range - if we change it, we will change the ecosystem. Balance human needs against environmental damage. Need to put a lot of work into discovering where that balance lies.

We have created several different ecosystems - we can damage those also without proper balance.

Disagree with statement the way it was written - there is a balance we have to reach. All of us use water.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Agree, but say "is now and will always be vulnerable." As we grow and develop there will be more pressure from contamination and pollution. People are more knowledgeable now than 40-50 years ago but constant education is important.

Already are vulnerable to pollution.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

If it did flood, it definitely would be a threat, etc. Not a concern here. Whether this weather pattern is a blip or a forerunner of more of the same to come - we don't know. In 1995, we saw the kind of damage that took place from flood. In dry areas, flood waters are dangerous due to the way the water courses flow. Water table has dropped, those places are interesting to watch if we do get a lot of moisture in a hurry. Should be taking some precautionary measures even though flooding seems unlikely at this time. Our ability to control that water flow is somewhat restricted.

Depends on time frame but need to be proactive and prepare for those cycles. Have to think longer term. Dikes in the wrong areas can cause worse damage (Mississippi).

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Agreed. Present tense not future. Need to give Albertans a better understanding of water issues. Incorporate it into the school curriculum is one method (provided it gives a balanced view).

Most water gets used by toilets - just changing those to a more efficient model would create a huge saving in water use.

Use efficient toilets such as one seen in Japan where the sink is on top of the toilet to wash hands (uses same water that flushes toilet).

More education - water not always being used efficiently. Reward those who are more efficient with incentives.

We should learn from such as Japan before our population reaches that density. Need political will as well.

Some government responsibility to train people about water use. Education across the board.

Agriculture uses the most water - have to focus attention there.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Have technology to use water wisely. Need to spend the money to get the water to the right place at the right time. Avoid waste. Investment would improve efficiency.

Additional storage may be required to sustain growth, especially for the long term. More is sent to Saskatchewan than is needed.

In U.S. they have 2-3 years of water storage. Our storage facilities are small compared to what we use. Caused problems in the last few years. Important to have more storage.

Not dams (focus on off-stream storage). At the Old Man Dam hearings, the first recommendation was to dismantle the dam.

Disagree that investment in infrastructure will solve anything.

Our storage is small compared to Saudi Arabia. Somewhere in between may be more effective. No need to rely on weather.

Experience and time shows that water storage is beneficial to southern Alberta.

On-stream storage allows us to protect the aquatic ecosystem on that river. If stored off-stream - can't get it back in river if required.

Concerned by idea that there is no environmental damage when dams are built. Old Man River was low due to amount taken off for agriculture. Needs to be managed.

question 3: are there additional challenges?

The arid lands of southern Alberta and Saskatchewan, if provided with water from the north, could remove a great deal of green house gases from the atmosphere.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Yes. Availability, capacity and location of groundwater aquifers. Also look at recharge capability. Danger if you start to use old water where recharge capability is limited.

Do we need to measure northern Alberta? They have lots.

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Who owns the water? Could protect from overtaxing systems but may deter future economic growth. Wrong thing to say in this province. Fundamentally disagree.

Sharing water can be very effective. Is it possible to blend those two?

Industry in our area would not have had access last year if we had not shared. FITFIR okay but shouldn't let anyone go without.

Shouldn't we prioritize based on type of use?

FITFIR - if noone had the hammer would the sharing have worked? Oldest licenses were the most generous. This is a finite resource. Water Act includes a clause for water trading.

Legal implications. If there are fights over water - only the lawyers win.

c. Allocate water based on its most beneficial, or valued, uses

Concerned it's the wrong question. Define "beneficial" - varies across broad spectrum of interest. A lot of issues come to bear. Too subjective. Allocation should go to highest value (we think food production). Price of food needs to reflect the cost of production.

Value - who decides? Pricing of end product (food) has to go up.

d. Allocate water to further uses even if this potentially harms aquatic environments

Red herring statement. "Potential" should be removed. Makes it easier to dispute. We can have win-win situations with this. Doesn't have to be one or the other.

Violates Water Act as it currently stands - it requires enough water is left in rivers for aquatic environments. Would be a major change in current policy.

FITFIR/Beneficial: if more water is allocated than the system can provide - you have to go back to original licensees. Poor way to run the whole system.

"Potentially" does belong in the statement. We have a history of waiting until it's too late. We have to be a step ahead.

e. Set aside water for future population growth before there are any shortages

Where will you set aside storage without knowing where the growth will be? Will you cap a city's population? Or bring in water from northern Alberta for possible future growth? Difficult question.

Cannot physically set aside the water. Do you reserve the allocation - is that what's meant?

Q. Aren't cities and towns already allocated based on population growth? A. Yes.

If so, municipalities should look at efficiencies also.

Urban population has a duty to limit amount of water they use. Also the irrigation industry. Why are we so afraid to admit there may be a limit to growth? Someday we will reach the limit. Learn from how nature lives within its means.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

We should avoid water becoming a commodity. You can currently sell the right to use water. This is more of a short term pressure relief valve than a long term solution.

License transfers last year may have been a short term fix but it allowed us to stay in business. Supposed to be better this year, but we needed that fix.

Last year's trading was not water license transfers, it was trading on rights to water with a license. Some licenses are only partially used, these would be taken up in the short term and in the longer term you're back to where you started.

g. Encourage more efficient use of water through pricing to reduce overall use

It's inevitable. Spinoffs would be more efficient use, increased productivity, or reduced consumption. There is a legal issue with water being priced (NAFTA). We don't know.

Encourage volume charges for delivery rather than putting a value on water itself.

Don't see it happening anytime soon because of complexities and costs involved (metering, etc.). It could come but not soon.

Already is happening - last year growers were monitored (metered) on their consumption.

Population of world will increase perhaps 50%. We will have to find some way to produce that food. A price on water will increase the price on food. Will create economic disparity in the world. Must remain a resource controlled by the province and be available for food produce.

User pay a good concept but food is subject to international market

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

Investigate is key word. Has to be considered. May not necessarily be accepted (e.g. Meridian).

Storage off-stream is a very good idea.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Need to define "basin." Small basins would be more willing to accept than larger basins. Workbook says water doesn't enter river system. Original suppliers may not want it back with water contaminated. The key word is investigate - should investigate everything.

Cold Lake level is down about 2'. Encourage industry to completely recycle water and reuse it over and over again.

Conceptual problem with moving water between river basins. Pumping costs due to different elevations, etc. would be astronomical. - more money than any government has - we can't afford it.

Need to renegotiate with Saskatchewan - review agreement.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

The ecosystem will change if water is removed. Nobody has the right to make that decision. Changes that can never be retracted. Too destructive.

NAFTA - would be the biggest ecological disaster N. America has ever seen.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Depends on scale of project. May lead to those with money having water, those without do not. On a smaller scale seems okay, but not on a large scale.

May lead to water ownership by companies - be wary.

Some already actively doing this. Industry should recycle and reuse their water.

Industry is aware they are polluting. Need to invest more time, apply more resources to solve problems.

In southern Alberta this has been a very useful practice for much of our population - can't disregard this.

Should force industry to come up with cost effective solutions for recycling.

Key word is "investigate" - Don't advocate necessarily but need to investigate along with options for managing the Saskatchewan basin more productively.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

Good science is required. Concerned with present situation where science isn't always the best. Information (assumptions) are transferred from one place to another even though basins are different. A lot of science is politically motivated (grants from government).

Develop much like a zoo - don't worry about original site. Q. (from audience) What does that mean? A. A lot of endangered animals are preserved in zoos (facetious comment, but anything's possible).

The whole aquatic system is a resource - can't separate it.

b. Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin

Yes. Don't know if government should set that balance. Will be influenced by people. As we develop tools, we will make best use of our water.

Question the need for economic growth because there is a limit on it - doesn't necessarily need to be continuous.

Think about economic development rather than economic growth.

A healthy aquatic environment needs to be established before there is any economic growth.

Government doesn't determine economic growth. We need to be flexible - allow ourselves the ability to grow.

Population growth has slowed down or even reversed in some areas of the world - can be controlled.

c. Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm

Absolutely. We need to be careful we don't pollute.

Many questions implicate investigation - investigation takes time - need to go with precautionary idea.

EUB and Environment have many new requirements - why use "max" why not use "min" with no effects. Maximum may build up over time.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

Yes. DFO (Department of Fisheries and Oceans)are responsible for aquatic life in river. They can reach into watershed - jurisdictional problems between provincial and federal governments. Needs to be some resolution between different policies - integrated - water is one part of it.

Natural or artificial ecosystems (such as irrigation) become defacto - define parameters of what we are looking at. Areas in world with much higher density - should be room for a lot more people and agricultural production. But should be looked at. This process long overdue.

We've been neglecting watersheds for a long time. Uses such as golf courses, ski hills, resorts - all have to be investigated.

f. Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use

Yes. We sort of do it now but depends on how you define "protect."

In U.S., irrigation dam shut down in order to protect aquatic life. Cost benefit analysis showed it was not a good way to spend money. But because they couldn't stop the project based on a cost/benefit analysis, they used the fish (suckers) study as a way to shut it down.

additional comments: about water issues

Q. We've had a number of water strategy committees, basin management plans - how does this water strategy integrate with these other initiatives - will it direct water basin plans? How do we sequence - what about redundancy? A. (Robert) A lot of initiatives currently underway, particularly in southern Alberta. Water strategy is trying to look out over a long time period. Broader level questions. Could say we should wait but we need to keep going with good things happening on the ground now. This strategy may focus some of those plans - conflicts will get worked out. We need to know where you think our priorities should be.

additional comments: about water strategy process

These questions are controlled by whoever made them. I'd like to see the average citizen be able to make their own questions. A. (Jim) You can do that.

Be careful with way process is set up. Questions imply they are looking for a particular answer. Predetermined outcome?

There is a division in Alberta where some of these questions don't relate - some are sensitive to both areas but there is quite a difference. Made it difficult to answer some of the questions.

Calgary: March 12

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Generally agree there is increasing demand. Unsure of nature of data collected so far. Expensive to get more but we need more. Critical issue in southern Alberta for agriculture and municipalities. It's an abuse of the system to not come up with a strategy - we will pay down the line. It's time to develop a strategy.

Glaciers are receding - concerned if they dry up - what will river systems do?

b. Access to safe drinking water will become a significant issue for Albertans

Need a definition of "safe drinking water." How does government define it? Definitions vary depending on location. How do you help people achieve new standards as they change? Can rural areas afford the type of water treatment required? Where's the empirical evidence that this will become a significant issue? Everyone currently has access to safe drinking water (at this table). We have the technology and means to deal with water quality. In the future, it shouldn't be a problem if we deal with it today but it costs dollars. Issue of accessibility - difficult to generalize across Alberta where there are many variations and differences. Is there a black cloud? Should we be worried?

Define "safe drinking water." We currently have a sizeable amount. Place emphasis on control and maintenance. Cities have secure drinking water. Safe drinking water is being used to water lawns. Rural areas don't have access - to get access costs a lot of money. No government support for testing (assuring proper equipment).

Agree that water supply is safe in Calgary. Not necessarily everywhere - need to be careful.

d. Climate change will seriously affect water flows in Alberta

Won't debate climate change. Government needs to address the changing water levels year to year, generation to generation. Need a comprehensive management plan. Government needs to look at now. May not be as high a priority as some of the other challenges. If the system is finite, it becomes more important to define a very definitive system with stringent guidelines for the long term.

Agree generally.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Supply and demand: there is a limit to the supply especially in the south where strongest economic growth will likely occur. Must pay attention to solving the equation. If you undervalue water, people don't have to manage it intelligently. If managed properly, we could have more economic growth.

Agriculture, industry are also driven by population growth. The type of industry and where it is placed is also important - impacts downstream. The supply will eventually limit the use. We must acknowledge it, plan for it and deal with it.

Fish drink water too (re quality of water).

Underscores the need for levels of communication between agricultural and non-agricultural sectors - especially the level of cooperation in the use of the water. Much of water earmarked for agricultural irrigation - also serves purpose of supplying water to smaller centres throughout the province. This needs to be recognized by both sectors. There could be an eventual clash between sectors unless there is cooperation.

Feed lot legislation. Impacts of fast food industry. Are we going to allow them to dictate where these industries are placed and what is required?

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

A priority - but don't need to give up on economic growth - balancing act. Stress need to protect aquatic systems.

Economic development will eventually affect aquatic ecosystems. When running short of water - how do you stop economic development? Need to decide which is more important. There are other considerations such was water conservation and recycling - many methods not utilized yet. Urban sprawl will take agricultural land out of production - water use reverts to municipal development. The choice will be quite a ways down the road but should still think about it.

Sustainability is the key word. Some civilizations disappeared due to salinity. Once we start irrigating, we need to continue to force water into it. Once the flow stops, you kill the soil. What this soil needs is more and more water to prevent salinity killing soil.

Worth looking at diversification in agriculture. Currently takes a lot of fertilizer and water. Intensive systems requiring less water might be a way to balance aquatic systems with economic growth. Change what we're doing.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Unanimous (at table) that it is important. Local examples of where water is a concern are agricultural industry, industry, and cattle operations. Community programs to protect and manage water. Maintain wetlands.

Agree it's important. Everyone pollutes: all industries, farming, people. How do you stop it?

Need to look at concept of sustaining economic growth. Impossible not to result in serious pollution and contamination. Need new models to determine what we need for economic growth. Why are we still polluting to gain economic growth?

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Unsure. Natural drainage systems have buffers built in to avoid floods. Development issue also in upper part of drainage. Logging and development can determine whether the systems can handle capacity in difficult years. Under-developed facilities can't handle such things as raw sewage in seasonal water course, storm sewer run off ending up in rivers (heavy metal flush). Is this an excuse to build more dams (that we don't want)?

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

In future we'll have to rely on solar power and wind power rather than hydro. As glaciers recede, we'll depend on snow pack and rainfall in the summer. Supply greatly diminished. Have to have a system that will divert the water straight to the ground and use water more economically. If we export electricity made from water - we're actually exporting water. Still have to allow 50% of flow to neighbours. Water in urban areas has to be managed closer (watering lawns may have to be foregone).

question 3: are there additional challenges?

Hydrogen supposed to be fuel of future (produces water).

Population growth is a major factor in water strategy.

question 5: where do you get your water?

Private	31

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

Alberta Environment is responsible.

Should be a shared responsibility. I am required to test and put in a system even though my water has tested repeatedly clear.

Pollution should be dealt with before it becomes a problem.

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

A lot of water co-ops are responsible for providing treated water. We treat it and are regulated. Responsibility currently largely rests with co-op members. Don't necessarily comply with Environment's requirements - may need help from government.

d. Pump water from distant sources to dugouts during times of drought

Happening now in High River. The water table has dropped drastically. Dugouts are banked up as livestock and crop farmers try to dig deeper or re-drill wells - huge expense. Individuals are bearing the cost currently. Years of bust go with years of boom. Owners responsibility.

Q: Do hydrological maps show where ground water is moving so people can determine what and where for instance cattle can be sustained? A. (from audience) maps from 1970s are currently being updated.

Groundwater is a very untried source. As glaciers disappear - less groundwater. Piping it might be an answer but from where? Should be a shared responsibility. Also investigating deeper wells.

Policy of helping farmers drain wetlands has been a cause of lower water tables in aquifers. Should abolish.

question 8: small municipal systems ... whose responsibility is it to ...?

a. supply technical advice to small municipalities about facility operations, maintenance and monitoring

Small communities cannot maintain provision of quality drinking water. Should have same access as people in city.

The same body that governs setting up water treatment plants should offer some sort of grant or revenue. No grants are available for small communities. No funding for co-op wells? Municipalities have a body of people who pay taxes - 4 or 5 in a co-op does not have a tax base. By not supporting them, taking away their economic growth. Funding should be across the board. It's the Province's responsibility - not municipality as they don't make the law.

Private septic systems not treated as something Environment should address. Lots of people on relatively small parcels of land contaminating water. Need to rethink how we handle.

What happens to waste water going back into river? Large cities have leading edge facilities but smaller municipalities cannot afford such. Points to regional systems. Calgary currently takes waste water to treat and supplies clean water to smaller communities around Calgary. Calgary taxpayers pay for that infrastructure.

c. Develop regional water supply systems

The cost is paramount. Heritage Trust Fund - lend it to municipalities such as Calgary to develop regional water systems at no interest. It's one way in which smaller municipalities could be helped out.

Bow River Water Shed - testing 8 or 9 years - septic systems could be a time bomb if we're not careful. At that time, the water was pristine (upstream for Calgary), downstream was not useable for irrigation. Storm water run off from driveways, fertilizers, etc.

Infrastructure needs to be maintained and replaced. Initial loans may be fine but don't address the long term. Need more sustainable answer. Concern with regional sewage system - sending sewage to Calgary - what happens when there's a pipeline failure near a water course?

Evolving school of thought to manage decentralized systems (replace single septic systems). Government needs to accept their additional individual systems that work and are cost effective. Need to encourage. It's an alternative to hooking everyone up to million dollar systems.

Add your own example ...

Government should provide technical assistance. Also list of approved water treatment system suppliers.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Government should. Groundwater is unknown at the moment. If you don't know what's in your aquifers how do you decide if you can allow further development? Have to know whether it will sustain. Can't get answers now.

Would well logs help? Alberta Research Council has done. But out of date.

Well logs - fresh water - pretty hard to determine.

Serious problem attendant on discovering what resources are - no governor on mining and exploitation conditioning. As soon as we know resources - much more rapid depletion.

d. Allocate water to further uses even if this potentially harms aquatic environments

Money gives validity. Bow River brings tourism to Calgary. There are times you can have it all: a recreational asset, a revenue generator and a nice river.

Methodologies available to determine minimum flows to maintain healthy eco systems. Make this a priority and follow recommendations.

Figure out how to use less water. Use at different times and in different ways but maintain minimum flow.

Q. Do we determine environmental needs before allocating? A. (Robert)Yes. We try for balance between all things under the Water Act - but no guarantee that one is the first and only consideration.

g. Encourage more efficient use of water through pricing to reduce overall use

Challenge objectiveness of question. Reduction in use doesn't necessarily follow pricing. It's a formula for getting large vs. small. Potential for abuse. Creates a new bureaucracy, not necessarily water preservation.

Water pricing does make a difference. Water meters make one more conscious of use. People with more money will pay for water.

If oil companies had to pay for water being injected in wells (never to be used again) - it wouldn't happen.

Meters should be on all urban houses in Calgary. You can tell who is and who is not on a meter. Heavy users such as car washes should be charged more.

Q. Do people who irrigate pay for their water? A. Irrigators pay for conveyance from diversion point to their field.

Q. How is it determined how much water irrigators get? A. (Peter) *explained allocation and FITFIR*. Q. Is it forever? A. If granted under the previous Act, it is in perpetuity. Under the current Act, it's granted for a term and can be reconsidered after that term. However, the government would need adequate reason to deny.

Consumptive vs. non-consumptive use. Look at how water will be used (i.e. use sewage water for cooling towers). If you're using water that's non-consumptive - charge less. If it is, charge more.

Would we use market value and export to the highest bidder? If we start under NAFTA we can't shut off the tap. Be cautious. Government is only thinking revenue. Water sales will be in our future unless we are vigilant.

Take exception to saying users pay on irrigation. They do get government money to maintain those systems and improve irrigation districts.

Potential for big business to buy allotments.

If only reason is to slow down use - not good enough. If it's to save environment - that's a good idea. If it's to encourage recycling water to ensure protect and preserve the resource - that's good.

Q. Well water: are there grandfather clauses for those drawing water for years? A. Yes. 26,000 applications were submitted. Someone registering now would have a currently dated license. People who live by a river, by a lake, or over groundwater have a statutory right to that water for household use.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Who would pay for it and who would benefit? Potential users should pay for it.

If you transfer too close to the U.S. border, you know where it will end up.

Comfortable caring capacity: if a municipality doesn't have the capacity - they should not expand. Okotoks will limit their population growth. Others should do likewise. That is sustainable growth. Inefficient economically to locate an industry somewhere and then build the pipelines. Put the industry where the water is.

S. Saskatchewan needs help. Both rivers (N. and S. Saskatchewan) join in Saskatchewan anyway so we could divert water from one to the other without causing any harm.

Look to California to see what happens when water is diverted to grow crops. They are a mess.

Transferring water from one watershed to another is very dangerous.

Provide incentives to industries to locate close to water.

The ecologies of the two Saskatchewan rivers are quite different. Dangerous to mix.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

d. Identify sensitive aquatic environments or habitats that require additional protection

Concerned with lack of integration between land use planning and water management. Wetland policy shelved: natural water management was headed off. No dispute that the best water management landscape is a forest: provides not only water quality but also flow. We have virtually ignored the water function of a forest. We have a problem when we treat these things completely separately. Let's not keep making the same mistake.

Crowfoot Creek Watershed Group - developing a whole community plan which includes industry, agriculture, town, etc. Working on best management practices. Local residents usually best at identifying where the problems are. Best to have them work together - not top down. Solution comes down to individuals getting involved in their own watersheds and learning about and understanding the tradeoffs made between various users. Grass roots level is the only way to go. We're having reasonable success.

Q. Why is water allocated to water bottling companies who are taking it out of a dry area of the province to export - should it continue? A. (Peter) Bulk export is prohibited. That type of commercial use is still available. Can't tell people they can only sell in Alberta. Amount of water used for bottling is very small.

Q. How fast is that industry (bottled water) growing? A. (Not known)

Missing question: no attempt to rank benefits of uses of water. Much easier to economize on water used for irrigation than to cut back municipalities. Charge for water and use the same rate for everyone.

Reconsider such things as compost toilets rather than flush toilets.

Don't know of any irrigator who willingly pays for the power to pump more water than is needed. Only way to cut back is to cut back on growing.

There are benefits to everyone from assisting in irrigation - that's why government provides assistance.

There are other alternatives for toilets (Australia), different technologies. Change codes to make people use less water.

Toilets aim at urban use which is not the biggest use. Surely there is technology for improving irrigation use - a far larger percentage of use.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

Hasn't been done yet. Worth doing. Land use does have an impact on water.

Integrated plans are essential: if we don't protect watersheds and riparian habitat, they will die. Ludicrous to go ahead with a strategy without protecting river system.

A key point. It ties in the problem of running water and sewer pipelines into other regions. Breaks are a concern. Bragg Creek trying to address through a plan. May have to limit population to only as many as the area can sustain.

Westlock: March 14

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Agree (one of our top three).

b. Access to safe drinking water will become a significant issue for Albertans

Up to government to assist us in having safe drinking water.

Depends on where you live.

c. Water availability will limit growth in Alberta

Occurs already in areas of this district. Some producers are up to their growth limit with not enough water to expand.

We should ensure that we know capacity and use it in a diligent manner so we won't have a problem - although we still "may" in some areas.

"Will" - there is no assurance that it will happen.

d. Climate change will seriously affect water flows in Alberta

Don't believe it will "seriously" affect. Warming up means more melt in the mountains, more flow.

Climate change is a cycle.

Define "climate change."

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

It's very true.

Politicians make it happen that way.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Recognize that in some areas, we may have to put a limit on economic growth in order to maintain sustainability - cannot have economic growth at all costs.

Government regulations don't help us to look at things in this way. There are numerous examples of where economic growth was allowed to continue at the cost of the environment. There hasn't been enough homework done to date and regulations to help us with these challenges. Government must show due diligence around these issues or it's an exercise in futility.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Already is.

Why don't they have a question about what is causing our water to be contaminated (Swan Hills)?

h. Flooding will pose a threat to human safety and create potential damage and economic costs

It's your own fault if you build or develop in a flood plain (self-inflicted problem).

Watersheds, headwaters are gone - impacting downstream.

The way it's stated - it's a given. Control is a different issue. Control is the challenge.

Spring flooding can become a plus if it only happens every 20 years or so.

Stop draining wetlands then water wouldn't come as quickly.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

This is a key element: if we learn the extent of the resource and regulate to use it wisely, it will help alleviate a lot of other concerns about having enough water, good quality water and its impact on economic growth.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Concern re cost of building dams: we do have a relatively large infrastructure already that is the wetlands. As watershed groups grow and learn, they realize it's just not the creeks and rivers that make up the watershed - it's the entire picture. A lot has been lost to drainage. Watershed-based planning with a bunch of different people at the table.

All depends on kinds of solutions proposed. Yes, dams are expensive.

question 2: indicate the three most important challenges for the Government of Alberta to address

f, g and i - [i] have to nail it down or rest are for naught (knowledge).

a, c and g.

b and i - seem to be most important.

question 3: are there additional challenges?

All are important. Difficult to interpret. Such as building dams - doesn't make sense. Messing with watershed. Draining sloughs.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Definitely in agreement. How can you make good decisions without knowing?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Not a good system - doesn't allow most benefit from use of that water. Prioritize the uses.

What's high value to me may not be valuable to you.

Q. FITFIR - could it be placed in urban areas? Would car washes have priority over processing food. A. Yes, that's possible.

Car wash vs. food processing plant - logical pick is for the food processing plant.

c. Allocate water based on its most beneficial, or valued, uses

Who decides? Who defines "beneficial"?

Shouldn't throw out FITFIR right now - may be amended.

It becomes a difficult decision between different agricultural uses. FITFIR then makes sense because who makes the decision?

d. Allocate water to further uses even if this potentially harms aquatic environments

Strongly disagree - not sustainable.

You may have a scenario where yes, I may agree - but who decides?

e. Set aside water for future population growth before there are any shortages

Consider it simple, good water management. Need to set aside resources for future generations.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Generally disagree. Will this lead to water being for sale? If you place a value on water it makes people respect it more. Water in Edmonton is metered, in Calgary not. Edmonton uses about half of what Calgary uses. Who will decide what is an acceptable transfer? There probably are situations where it would be a good thing to do. Scary unknowns.

Oil companies are attempting to purchase water from land owners. Landowners sell the right to access that water. Can be done under the table.

How can you collect money for something you didn't pay for? Shouldn't be available for sale.

Supply and demand would affect the price of a gallon of water?

g. Encourage more efficient use of water through pricing to reduce overall use

Difficult to interpret. Define "pricing." Define how you want to reduce overall use. It has to be reviewed and more clearly defined but any decision is possible.

Depends on who user is. If agriculture has to compete with oil companies and pay for water - food will become very expensive.

Not fair to price water - there are other methods that can be used.

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

Theory nice idea when there's lots of water. Works fine if high season is more than everybody wants. How do you determine who gets percentage of high flow? What about future expansion?

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Can't seem to manage closed systems now. Don't mess with open diversions.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Opposed. Environmental concerns, disease transfer, the price society would have to pay. We have the water, the oil and gas, the infrastructure. Why would we want to send our water somewhere else so they can develop? If anybody needs water, bring the development here. To give it away encourages more population elsewhere. We'll end up with no jobs.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Most of these are very important and need to be investigated - addressed.

What about conserving our water? Conserving can lead to better quality water, less use. Take personal responsibility.

question 11: water conservation options

a. Establish a price for water used by industrial and agricultural operations

Difficult to establish price between sectors. Two different playing fields. Mom and pop operations may have to fold. Levy or tax or allocate a certain volume of water at a certain rate - use beyond that rate would be penalized.

Cities and towns should also be included, as well as industrial and agricultural sectors.

Acreage owners are also not included. Where do they fall?

b. Establish a price for water used by individual households

Establish a three-tier pricing system. First tier: per capita system to everybody - free. Second tier: by volume to allow for household use. Third tier: by volume for luxury use (such as pools).

c. Educate Albertans about water conservation values and methods

Slow process, some kind of incentive to get people to improve (similar to recycling). Will take a generation at least without incentives.

Developing incentives can be as difficult as water policy itself but need them to speed change.

d. Establish water conservation incentives (e.g. tax rebates) offered by government

Some agree, others feel it should focus more on education - some concerns with incentives.

e. Set targets for water conservation for various sectors using best management practices

In theory, good. Actual logistics across sectors, difficult. Who decides what are the best practices? Difficult to implement.

Add your own example ...

Motion detector taps - perhaps government should offer at a reasonable rate.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

Who knows how much you need for a healthy ecosystem? We don't know - how do we answer these questions?

If you don't measure it today, how do you plan for future?

How would it be done?

b. Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin

Will depend on regulations associated with it. Oil company storing water in mined out pits as unusable.

c. Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm

We may not like some of the answers they come up with but we have to do it.

Should have been doing it for past 50 years. What assurances that they will do it now?

d. Identify sensitive aquatic environments or habitats that require additional protection

Identify what is in water source, what you will have as a result of development along the flow (discharge) and what system can sustain.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

Advisory groups should have the ability to make decisions. Water will be bigger than health, education, oil. The management issue is absolutely crucial - authorities have to be looked at.

Q. Does provincial government have in place any policing on waste disposal, etc.? A. EUB or Environmental Enhance and Protection Act. Approvals based on what they can and cannot do. Monitoring is done.

Who decides, who polices, what are the consequences for failure, what do we want? These are management questions. A basin advisory committee where a "joe average" mixture of representatives can have some involvement in decision making relative to their particular basin is a concept (if it has some decision making ability) that has some merit. Not sure that I trust politicians to make these decisions.

Watershed groups - they are grassroots, the people who live on the land are making decisions. Very encouraging.

DFO (Department of Fisheries and Oceans) are looking after already, protecting ecosystem.

Wetlands have been destroyed, particularly in oil sands area. How are they going to replace or restore what has occurred? They are important. Is anything meaningful to come out of this when regulators have already had the opportunity to alleviate some of these challenges, but here we sit discussing it?

Add your own example ...

What about effect of recreational use on the water? Some lakes are heavily used, plus cabins (sewers leaking) etc.

additional comments: about water issues

DFO office in Edmonton are fairly heavy handed on what they believe is right. If federal government has their own agenda - what does provincial government have a say on? Will provincial regulations mean anything?

Government needs more time to develop any change in policy.

No matter the amount used for urban or agricultural use, none is lost from the water cycle. Not so with the oil industry: they take water from the system and pump it down into salt water aquifers. No reason to do this (except money). It's a criminal practice. A waste.

additional comments: about water strategy process

Once responses tabulated from all over Alberta, would like to review them.

Challenges left too much open for interpretation.

The way these questions are presented - they are a given. Does anyone disagree?

Need to capture Westlock concerns.

Advertising was poor - people didn't know about the meeting. Notification was not soon enough or not to the right people.

Can't answer these questions without first studying the information.

If we had received package earlier (in the mail), we could have read it over and been prepared for a session such as this. Can't help but feel pessimistic about the results of providing our advice tonight. Many people have worked on previous strategies (wetlands recovery programs) with the intent of helping to improve things. Their recommendations on safeguarding wetlands were supposed to have been passed on to government. Has government implemented any of that? Will this also collect dust? A. Had to happen in sequence - Water Act first, then came management plans - currently working on wetlands policy.

During Ag Summit, the government had already started a plan (that was never divulged to us) but they are implementing it. Where do we stand with this? Can't believe you're just going out to ask opinions - we hear stories about pipelines, changing rivers (diverting south). We are worried about this. Also worried about people who keep livestock, use fertilizers, and use sprays. Westlock had to buy creek where raw sewage runs down to Pembina.

Not enough people here from area to give a true indication of opinion.

Medicine Hat: March 18

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

No consensus at this table - unsure. It's relative to where development occurs within the province since 80% of water is in the north and only 20% of use is in north. If growth would concentrate in the north - probably wouldn't be as important. Water supply is decreasing - don't know whether it is increased use or related to the weather (lack of moisture over past few years).

b. Access to safe drinking water will become a significant issue for Albertans

Yes. Whether the problem is real or not, there is a perception that it is true so will have to be addressed. Large petro chemical industry punches into aquifers - little knowledge about how substantial our aquifers are and how they are affected by such activities. As urban centres increase in size, there will be issues of water supply and a percentage increase to dilute effluents that are returned to the river basin.

Agree. In our area with heavy livestock industry and farming industry (chemicals), we've already noticed an increase in water being tested for chemicals. In southern Alberta (shallow wells), aquifers are already contaminated. We know this already and are already concerned.

Drinking water: comes in a bottle from town or store. Huge majority of water is flushed. The level of quality needed for that is significantly different than for drinking water. For the water we actually drink it's probably not going to be a problem. Water quality for other uses (bathing, flushing, lawn irrigation) is a different priority. Affordability should be a part of it - access is easy - based on cost. A lot of people don't drink tap water anymore.

Wording should be "potable" water. Understood that it means water that is safe for human consumption.

Your skin absorbs chemicals from water also - "safe" goes beyond what you drink.

Bigger issue to be concerned about than just drinking water - there are herbicides in rain water and various other organisms and animals that drink water. If they're ingesting carcinogens and passing them along in the food chain - we have to be concerned about that as well. Estrogen levels in south end of Mississippi River are starting to cause huge problems with human population.

c. Water availability will limit growth in Alberta

Agree. Initially thought only in the south. But in the north water, will limit growth also. Biggest users are agriculture and industry. Even in the north, the industry may not be where the water is. The availability of water has already limited growth in the south.

Last year almost lost an industry due to lack of water.

d. Climate change will seriously affect water flows in Alberta

Definite maybe. "Can" is a given. Not known if it "will" in the future. There are cycles in weather - what do we call climate change? Is it a permanent change from ice age onward, or a shorter term aberration.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Agree. Industrial - unsure - will grow wherever use and process occurs. Agriculture is a process use larger in the south because of the heat needed but we need more water. Specialty agriculture growth may be limited.

Urban growth will concentrate in south as it always has. Major user and polluter of water. Urban growth will become a more significant factor.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Disagree. Definition is required. Shouldn't have to choose. Aquatic ecosystem is not a term as well defined as economic growth. Where do we draw a line to compare (from year to year). Choosing will force a fight when it should be sustainable on both sides.

We have to let 50% of the river flow go on to Saskatchewan and Manitoba. Not a worry for this area - the aquatic ecosystem.

Sustainability of the aquatic ecosystem will control economic growth. If the system can't recycle itself, the economic growth will not happen at all.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Unsure. Vulnerable now. When we adjusted the question to the future, some felt that as there is more development, the water will be more vulnerable. On the other side, we're also doing much more to mitigate that risk, even now. In Europe, rivers have been cleaned up substantially in recent years. As we identify what is polluting our ground and surface water - we are doing something about it.

Disagree. Definition is required. Shouldn't have to choose. Aquatic ecosystem is not a term as well defined as economic growth. Where do we draw a line to compare (from year to year). Choosing will force a fight when it should be sustainable on both sides.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Unsure. Unfamiliar with flooding in this region. Issues are about allowing development in flood plains. Up to department to provide more information on water levels in flood plains. Too much water coming out of mountains in an uncontrolled fashion (due to clear cut forestry) will lead to a trend of more flooding.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Wording is not appropriate. Ongoing issue for southern Alberta - is already important.

Very important - becoming more important. The pressure is on volume users of water to justify their volume use to people who may not understand the real benefits of that volume use.

Concerned about the wording "how to use water wisely will become important." The oil patch uses as much water as Edmonton, Calgary, and Red Deer combined. The majority of this water is pumped down wells for flooding - lost permanently for use. Doesn't go back in the system. Serious situation that is not being addressed.

Use salt water as we did off-shore. Build pipelines to bring in salt water.

Don't think much of that idea.

A family of 5 uses 176 gallons in winter and 319 in summer. Significant amount of that goes into the grass. A family of two uses 99 gallons in winter and 403 in summer - it still didn't save the grass. If you only need 99 gallons to live on - do you need 400 gallons to keep your grass green?

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Will likely have to be some investment in managing water to help reduce effects of drier years and store water in wetter years. Should also use water more efficiently, both on the farm and in urban areas. Instead of government putting all money into infrastructure, should also promote efficiency through use of incentives.

We should be spending money on off-river storage. High flow water passes through the system without much use made of it. Ecosystem and recreation benefits. Better than dams, that cause disturbance to wildlife.

Two methods of off-river storage. 1. Dams. Old Man Dam - what would Lethbridge would have been like without it? Rationing would have been much worse. 2. Make cities have a lagoon to hold enough water for a year. Study in Calgary to take water from reservoirs to north of the city, not putting it back in the system. Edmonton dumps sewage in river. Should control what goes into the river (run off). Can it be stored elsewhere and used for other purposes? How do they handle it in Europe? Maybe if intakes were below your outputs, you would pay attention to what goes in the river.

Other types of investment that can be made to assist in managing water. Managing inputs or managing storage. Needs much more discussion.

Human investment - Believe government cutbacks have caused a challenge (only one field man in the department considering the level of irrigation in this region). People investment needs to be increased to help us deal with these challenges.

Dams haven't been done effectively - you can repeatedly dam the same river. Dams are used for flood control and power generation on Boise River by the City of Boise and they have saved the city time and again. Off-river storage depends on fairly shallow coulees that have a high evaporation rate - not economically feasible but still needs to be looked at. Some haven't been used in a 100 years. Investigate and then proceed and build some of those necessary storage areas.

Keeping effluent water out of river won't happen. Calgary puts back 90% and we need that water. Should maybe be cleaned up better. If we can store a good portion of a bad year's allocation - we can level up the flows and the better it is for the river.

There is no option but to investigate water storage - both on and off river. Historically, urban sites (of any size) have developed along rivers. Agriculture also comes off rivers (for the most part). Last two years have provided us with a vivid example of why we need storage. We would have basically had someone else's effluent for water without the Old Man Dam.

On-river storage is essential. Lake Mead (Vegas) 600' - 45 miles long. If we could put a dam on the Bow River. The 90% dropped back in from Calgary - with a dam we could catch the spring off - the dilution factor would be there and pollution would become insignificant. The only way to get potable water in quantity even with large urban areas upstream.

On-river storage (dams) seems to be the most effective. In the case of the Old Man Dam reservoir, it only covers about 6000 acres. In comparison, it holds a great deal of water due to its depth. Off-river storage doesn't normally have that depth.

question 5: where do you get your water?

Private 30	Small Municipal 14

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

Owner's responsibility.

Shared responsibility.

Costs should be borne at same ratio as if you were living in an urban municipality (testing). I'm responsible for taking sample in and getting it tested. No assistance is a disincentive to getting it tested and having safe water.

Q. Do urban municipalities receive funding for testing water? A. Operational costs are borne by municipality.

Private systems are a lower risk because they look after themselves better. Government needs to keep out of it. I have more concern for my safety than the government does.

Shared. I have no control on what's happening elsewhere in the aquifer so I should have assistance in getting my water tested.

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

Congro water co-op formed 10 years ago. Government was initially generous and funded 75%. 10 years later we upgraded and then it was 50-50. Sore spot in southern Alberta. For a lot of farmers it's their only source for water. Federation of rural co-ops is trying for a policy of assistance to get these systems going. During good times, put in these systems. When bad times come, you're ready for them. Shared responsibility.

Government should be involved in financing these co-ops to use water in a better way (different sources). Have to careful about how much involvement government has later.

d. Pump water from distant sources to dugouts during times of drought

The government has offered this program for some years. We're in business but how much can we ask the public to support our business? Are we a valuable enough commodity so that people want to keep our business alive? Nice to have, but we shouldn't expect help.

question 8: small municipal systems ... whose responsibility is it to ...?

a. supply technical advice to small municipalities about facility operations, maintenance and monitoring

Missing: Government changing the rules for water treatment plants. Changing the rules slows our plans down by 50%. Technical upgrades are the government's responsibility if they are required by the government. For new plants, it's a shared responsibility. If they ask for additional water tests - should be their responsibility. Advantages of scale are lost in small communities. Additional requirements slows down production of useable water, we run out.

Small water systems - need to rethink the issue of whether or not every gallon needs to be treated to the standards for drinking water when clearly not all is used for drinking. In house-treatment for water that will be ingested (or bought water) is clearly a feasible alternative rather than saying the government should pay to treat all water to the high standards for drinking water.

Dakota is putting in rural water co-ops and are moving water up to 600 miles. The responsibility is shared between three levels of government.

Limitations are placed on communities by provincial regulations and statutes. There is a long delay to change those policies when new technologies become available. Nervous about government providing that advice - new companies and technologies should be able to circumvent the system and given the opportunity to pilot new technologies. Too much lag time. Need some mechanism to speed up process especially as systems become more and more expensive and more technical.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Concerned that it may be too costly. Would rather have them monitor and have test areas where they do in fact determine ground water.

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Points of view range from social obligation to provide new users with a certain amount of water, to obligation to maintain the water quota to those people who have developed the infrastructure.

A lot of investment is based on that principle. Giving it up would undermine the security of my operations.

FITFIR is the only way to preserve discipline in the allocation of water. Discipline provides for not over-allocating. To judge which is the most beneficial use is a sure way to discord.

FITFIR works if water is being used efficiently - what about when water is being wasted and could be put to better use if reallocated?

c. Allocate water based on its most beneficial, or valued, uses

Agree that the idea of FITFIR has had its time and may no longer be relevant. Also recognize that people have invested in all sorts of things based on their right to water - can't pull that out from under them without some compensation. Water should be used most beneficially but not sure who would decide.

Beneficial and valued may be completely opposite (i.e. oil field injection may be the most valued but not the most beneficial). If I was rich, I might be willing to pay anything for water but it may not necessarily be for a beneficial use.

With water shortages, a number of farmers were selling their water rights to farmers in other districts who could grow more beneficial crops. That was an effective use of water. People decided on their own.

Be careful when considering "value." Pure dollar value isn't necessarily real value. Money doesn't buy everything.

Politicians don't always make the best decisions - this may lead to that.

d. Allocate water to further uses even if this potentially harms aquatic environments

No. Strongly disagree. Aquatic environments have been harmed over the years. Serious negative effects. We need to recognize that you cannot build a sustainable healthy economy if you destroy the environment.

Who defines "harm" to environment?

How would we answer if we were starving? It would affect our answer.

Using the water (dams) creates environment changes. But take into account that although a part is harmed, not all is necessarily harmed.

Elkwater Water Co-op (55 members) were restricted from taking water out of the lake when we hit the minimum lake level. A student study advised it would affect the aquatic ecosystem. AE realized it was quite beneficial. Need to take another look. Lake dropped due to evaporation not our use. Our water license shouldn't be affected by the lake level (mother nature - levels vary).

e. Set aside water for future population growth before there are any shortages

Tough question. Not like grain - can't really be stored that way. Generally agreed. Have to consider dams and the problems they create and off-stream reservoirs (evaporation). Agree but don't have answers on how it would be done.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Already in the Water Act. Not sure how it's working - seems okay. Not many people affected by it. Irrigation districts hold rights for entire district. Didn't see relevance.

g. Encourage more efficient use of water through pricing to reduce overall use

Disagree. Better to encourage reduced use through education and incentives. Everybody pays in some form. Some high end users can save by being more efficient (save energy too).

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Concerned about transferring water between river basins - there may be ecological differences. If it could be transferred from a higher elevation and quality was similar and ecologies would not be affected - it may be possible. Investigate it to make sure neither system is harmed.

If the ultimate use of this transferred water is for heavy oil industry, then the investigation would not be worth its price.

Ignorance is never productive. Key word is "investigate". We have to obtain information and be in the position to make an intelligent decision.

Maybe other things should be investigated first. We're not short of water in the S. Saskatchewan River but it could be managed better - investigate that first.

Misleading wording. Presupposing.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Necessary. Being done now. Every new license (junior) cannot impact the delivery of water during high demand times. Take water in high flow periods. Accommodate a year's supply in storage.

Sheerness Generating plant built were required to build their own reservoir to circulate their water (Fording Coal). County will be recipient of generating plant. Can only be filled during certain times of year.

Add your own example ...

Should correct an inaccuracy in the pre-amble to this section. It's misleading: "existing water license holders" already cover existing economy and existing human population. "Existing water license holders" are the existing economy and existing use. This applies to future use - Yes.

additional comments: about water issues

Is it all about dollars and cents? Are people willing to pay a reasonable cost for their food?

Protecting aquatic system: 50% of apportioned system doesn't protect the ecosystem. Some very shallow. Important to build reservoirs to support an irrigation system that will serve us well during drought years, not just in a normal year. Protect aquatic system and also agriculture.

A river is only so big - can handle only so much - almost at capacity now - greed gets involved. We're at the brink and then with a drought you have a problem We have to draw the line and determine how much the river system can handle.

Majority rules. However, the majority live in urban centres and have very limited knowledge of how water relates directly to our lives. How we use water is not known by urban dwellers. We need information to make intelligent decisions.

Sometimes we have to take away from an individual for the benefit of society. That will happen with water. However, society doesn't want to pay when that time comes. When historic licenses are taken away, we shouldn't leave the person stranded.

additional comments: about water strategy process

Q. First Nations' allocations have not been settled - they need to be consulted. Will you be speaking to them?
A. All first nation councils and metis organizations have been offered the opportunity to have meetings such as this one.

Is there a hidden agenda: are we someday going to put a price on water? A. It's an open question for discussion - not hidden.

Edmonton: March 20

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Yes - will become scarcer. Wetlands and prairie sloughs in Canada have decreased in the past 70 years - not a good thing. Impacts both humans and wildlife.

Agree it will become increasingly scarce. Flow in Bow was 65% of normal last year. This scarcity might be localized - some smaller water basins may be more affected than others and not necessarily in the drier areas of the province (where they are more used to having less water).

It is becoming scarce (now). There have been demonstrated decreases in river flow of 30-40% between 1920 and 1999 - a long-term decrease covering major river systems all over the province.

b. Access to safe drinking water will become a significant issue for Albertans

There may not be the resources for smaller municipalities to have the technical expertise they need (especially with this last budget).

In cities there are treatment plants. The majority of people who live outside municipalities don't get their water from treatment plants. They use groundwater which may or may not be close to problematic water (feedlots, oil wells, etc.).

In Villeneuve 30 years ago, they had flooding - now residents pay to have water piped in from Edmonton. We feel it's because of the heavy water use of gravel companies (contaminating the water). Some of the lake levels are going down at a pretty rapid rate. There should be some governing of how water is used - it's affecting the groundwater (aquifers).

c. Water availability will limit growth in Alberta

Economic growth may be affected in some parts - especially southern Alberta. Water could be used more efficiently - also especially in southern Alberta. Is water wasted in irrigation operations? Industries that use a lot of water, and are not dependent on weather, could go where the water is more plentiful (north). Is population growth a good thing? Rather, perhaps we could have economic growth based on working smarter. Locate population where the water is.

Agriculture, irrigation, intense livestock operations may not be able to go into communities with limited water. Oil companies should only be allowed to take limited water out of rivers, lakes - may not be viable at all in some areas.

d. Climate change will seriously affect water flows in Alberta

Have to plan for the worse case scenario. All levels of government should communicate and work together. Glaciers are melting - can we somehow store that water? To reduce the use of water, tax people who use it inefficiently.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Greater demands may be off-set by better technology and more efficient use. Pretty expensive to move industry up north.

Industrial and agricultural growth will increase demand. New technologies are not incorporated in Alberta very quickly. There are solutions (Europe). As the demand increases, you have to be careful how water is managed in order to not limit growth.

If economic cost was translated into a price - the natural forces of the market would create better use of the water. For instance, the most efficient methods of livestock production would be used.

Sturgeon County just approved a large hog operation north of Edmonton. Can our water system handle it? These operations can have 30,000 hogs. The County wants the tax base but it may pollute our water system.

Part of the problem with the use of potable water is poor planning (urban sprawl). Increase the density in downtown cores, make better use of the space you have. Don't chop up waters, change water courses. We do more damage with people than hogs.

Urban planning issues: human effluent goes directly into river during high storm runoff. Citizens are not fully aware of potential harm from pathogens that go into river.

Water is a cycle - available all the time - except where the oil industry is pumping it down into wells. A phenomenal amount of water is used. Should be addressed by government.

Surface water is being considered. But in our area it's aquifers. A hog operation is on an aquifer that feeds Lac St. Anne which flows into the Saskatchewan River. Once polluted, it's polluted for a long time.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Have already chosen economic growth over water quality. They will continue to choose that but we don't think they have to choose. We need regulations rather than guidelines, with enforcement. Many exceed guidelines.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Agreed. Any land use will cause increased pollution as a result of runoff. The impact, whether large or small, can only be defined by the [downstream] users (i.e. there is no common definition of healthy water - depends on what you need/use the water for). Should take a global approach for defining pollution impacts - rather than a specific approach - it's a larger issue than one basin. There are also different opinions on what is a pollutant - difficult to understand. Technologies and research will provide more information: what's safe today, may not be safe tomorrow when we have better information.

Concerned about factory farms from foreign countries which pollute both ground and surface water (areas east of Edmonton, part of North Saskatchewan River system). Manure, parasites, and antibiotics used in feeding go into surface water. Cities also contribute to pollution (salt on streets, common garbage that goes into rivers). Farms also contribute with herbicides and fertilizers.

Concerned about open shot holes (drilled by oil companies) - pollution running into water systems - people don't realize the danger. Realize what's going on around you. Developments, big holes, land surface cut up - the land structure has changed.

Industrial pollution of groundwater - consumers have to be cognitive of the types of products we use. For instance, (MTB)? used in gasoline travels in groundwater systems extensively. There are alternatives.

Government is responsible for the current regulations to protect our water. No government body, provincial or federal, is monitoring and enforcing those regulations. Won't get any better in the future unless we do something about it.

People who pollute are doing so because consumers want the products they use. Don't complain when you use these products.

Each sector of society wants to be the best wise water user. It's the cumulative effect of all of our water uses that is causing problems. It's the fault of activities that are not monitored and regulations not enforced. The budget just released tells us there's no money for it. With respect to manmade contributions to water quality, we can make wise use changes in municipalities, and in the oil and gas and agriculture sectors.

Huge hog operators are not farmers they are industrialists - manufacturers - who treat animals as merchandise. They don't care about the environment, water, or neighbouring lands.

The pulp mill in Hinton was developed in 1956 on not very stringent pollution standards. There's pristine water from Jasper right up to Hinton - east of Hinton it's like a sewer. How many tons of pollutants are laying in the Athabasca delta and how long will it take to clean it up? The Athabasca River ends up in Slave Lake and then in the Arctic Ocean.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

There probably is a lack of understanding of the scope of water management in the province. Many don't realize how water is used and stored.

Need to know if we're doing the right things. Are crops grown in the right areas? Recreational use? Need to consider all aspects respecting watershed and treatment of water.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Disagree. There are other ways to manage and conserve water besides dams and infrastructure. They cause environmental damage. Needs to be thoroughly researched.

Implies that major infrastructure is the only effective method of water management. Can occur without use of dams or other major structures. Learning to live with what nature can give you. It may be possible to have some smaller in-stream facilities that still allow for flow. Major diversions have a limited life span and require ongoing maintenance. Thought and planning required.

We need to move away from large lagoons (municipal projects) and start getting real community-based recycling of water. Costs one tenth the cost of major structures such as lagoons.

question 3: are there additional challenges?

Need to work together, rather than letting government go its own way.

All challenges should read "is" rather than "will."

Narrow minded to limit challenges to three choices. Most important that a comprehensive watershed management plan is put together that includes everything.

Needs to be a commitment made by the government to put some resources in this area. Mapping groundwater, scientific research into water quality or into technology of conservation. Nothing on enforcement or monitoring.

question 5: where do you get your water?

Private 16	Small Municipal 6

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

Individual pays.

Unless there's industry that's taking water away (in the aquifer) - then the industry should pay.

Amount of testing required by province has decreased drastically over the years. Federal government tells me it's the provincial health authority's responsibility to ensure clean potable water.

Depends where you live. If a small hamlet, village or town lagoon system springs a leak - who's responsibility is it if it's running across your land?

There is a shared responsibility currently - health department does do the testing - individual has to take sample in for testing.

When potable water is delivered in a municipality - you pay. Private system owners should also pay for it. It is a shared responsibility in that the provincial government assists by relaying the information to them.

d. Pump water from distant sources to dugouts during times of drought

Producers pay a fee for renting equipment - but at a reduced rate - it's a shared responsibility right now.

question 8: small municipal systems ... whose responsibility is it to ...?

a. supply technical advice to small municipalities about facility operations, maintenance and monitoring

It's not that the small municipal treatment systems were inadequate but that the operations were. Proper funding is required for operations - the plants are technically able.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Scrap FITFIR and start from the ground up. Use water more efficiently and beneficially.

c. Allocate water based on its most beneficial, or valued, uses

Don't agree with premise that rivers are fully allocated. Don't think we can legally get out of FITFIR - would have to buy our way out.

Water should be shared - basic human right to water. By 2025, two thirds of the world will have limited access to water. Some will have none. There will be wars over water. We have 20% of the world's fresh ground water. Who has the right to it? Agricultural and industrial uses also keep us alive.

Government can declare a law and throw out FITFIR. Colorado had an area with irrigation in place for 50 years but it was impractical. State bought up the land and converted it back to wildland area.

Special interest groups, government entities, organizations or individuals are sometimes poor decision makers. If you look at them as part of a large system (market driven economy) a group decision made by all players or stakeholders is the best vehicle for deciding allocation for the best beneficial use. Domestic needs are addressed first, economic needs are secondary. Preemptive ecologic needs which includes human needs.

e. Set aside water for future population growth before there are any shortages

When considering the use of water for irrigation, what you're producing is an important factor. Why irrigate to grow hay down south when other areas can produce it that have more water? Have a real value to what you grow in drier areas.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Lots of information in AE's library on closed diversions. Loan guarantees to companies and damage to ecosystem from an environmental and economic perspective - killed the idea. Minister doesn't consider closed diversions to be real diversions (proposed SE Water Co-op is an example of that). Open diversions are river to river. Closed diversions are from large treatment plants supplying small communities - but the water can cross water basins.

Q. If you take water from one river and use it and dump it somewhere else - how is that not an inter-basin transfer? A. (Bill) I think it is.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Don't approve of inter-basin diversions.

Against all water diversions but the government just doesn't get it. Some people have a vested interest in how water is managed. Their concerns are not being considered. Is the government finding some way to get the public to come to their way of thinking by "investigating?"

There are some kinds of economic development such as tourism, fisheries, and recreation that require a healthy water ecosystem. There will be some winners in economic growth even if there aren't large water diversions.

Key word is "investigate." If you don't want to investigate - are you afraid of the answers? A good example is when the government investigated the Meridian Dam - don't see a problem with that.

Studies cost money - the government can do anything you, as a taxpayer, are willing to pay for.

question 11: water conservation options

a. Establish a price for water used by industrial and agricultural operations

Water pricing may encourage better use but if you price it, it becomes a "good" and is included under free trade (NAFTA).

b. Establish a price for water used by individual households

For 30 years, we've been getting water out of our well. Now you're proposing charging for water? That's another tax. Need to get this out of the realm of government. This is government control to generate more money.

I already pay for the water I use in my house. The new water systems in new houses (multi-pipe plastic systems vs. copper piping) allow for a great deal of waste (both in water and energy for hot water). Will run into a lot of money over the years.

Pricing and conservation are two separate issues. We need to value water appropriately but pricing water disregards social concerns. Need to find a way to incorporate the value of water into decision making when making allocation decisions. Conservation is a valuable investment that doesn't need to be tied into pricing. Invest a fraction of what would go into large infrastructure into water conservation plans.

If we value the environment, we should be willing to pay for it. Put a price on water and the revenue could go into conservation, research, industry incentives, salinization issues, and revisiting older industries who were approved when standards were lower.

We currently pay for the delivery of water. Water itself should not have a price.

Add your own example ...

Disturbing that there's only 5 questions on water conservation. Conservation has a huge impact on all other areas of water management. Three out of the five are about pricing. Nothing about water use, recycling or other technologies. Not a good effort at issues of conservation.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

Who can pretend to know how huge the ecosystem is - no baseline studies, no money set aside for research. We don't have any idea of what it is we're trying to protect.

Q. Is someone coordinating the information we already have such as the northern rivers basin study? A. (Pat) NRBS is being used and we are following up on issues identified. There is currently a study underway assessing the cumulative effects of development on the Athabasca system. Information is being used.

Water Alliance is using information gathered previously.

Q. Determine the state of the watershed now - then develop a plan. Processes are well defined in the Water Act. There are limited resources in Alberta Environment, why are we asking these questions? A. (Neil) This is a comprehensive engagement on water - need to have all the issues on the table. There was a lot of consultation during development of the Water Act but it wasn't at that time tied into an overarching strategy.

In order to determine the amount of water required to maintain a healthy aquatic environment, the limit of water required will change over time (affected by climate change, increased human use) and those changes need to be considered. Risk curves, future growth, future sustainability, environmental sustainability all need to be considered. It may require us to prioritize uses - sacrifice certain industrial or human uses. In some places in the world water is more expensive than oil. We have a lot of water but are already seeing the results of a decreasing water supply.

A lot of knowledge and ideas here but when do they become a reality? Facing situation on a lake in NE Alberta which is disappearing. A water strategy was developed in the area but nothing is happening. We need a government that will address these issues, we are powerless. Reports are shelved.

A lot depends on research and our willingness to base decisions on research.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

North Saskatchewan Watershed Alliance (former Executive Director): It's the only way to go. There are world examples that it's the appropriate way to manage the resource and the environment. Have 100 organizations in our watershed to discuss planning. Only way to address cumulative impacts because of land use practices.

All water is the interest of the province. As economic growth occurs, a landowner with water is affected by what he can do on that land. There should be a remedy for that affected landowner - he should receive some benefit from maintaining water that is of benefit to others.

In 1995, there was a unanimous recommendation that there should be water management plans - how many times do you need to ask this question? Frustrating.

additional comments: about water issues

All the things we've discussed - some other place in the world has already done. Why don't we investigate what they have done - what works and what doesn't?

Q. I assume there is a premise that there are increasing pressures on Alberta's water supply. Has the government investigated why there are increasing pressures - why water is decreasing? Prevention is better than a cure. A. (Ed) Since the 1970s, allocation of water and water use has grown on an exponential growth curve that coincides with the industrial and agricultural growth in the province. Also, the population has gone from 2 to 3 million.

Market-based solutions: my fear is that if a water market is created (supply and demand), only the rich will be able to afford it.

Q. Large use of water for irrigation. Should limits be put on irrigation? Is there a cap now? Certainly shouldn't be lifted. A. Irrigation is often FITFIR - therefore have a high priority.

If water is market-based, it will end up like every other market - with very few controlling it.

This audience is far ahead of the vision of the government. Don't think government cares when they are cutting budget to AE. We want you to do all these things (although not more dams and diversions). Tell Minister to stop cutting budget.

additional comments: about water strategy process

Gone through this process before - concerned it will end up same way (going nowhere).

Amazed at the number of no-brainers and platitudes in this document [workbook]. We have serious issues to deal with - don't feel this process will make things happen fast.

Welcome opportunity to participate in public forum on a timely issue. We are at a crossroads in Alberta. People are relocating to the Edmonton/Calgary corridor due to opportunities here. There will be population growth, a demand for jobs and the economic and industrial activity to support that growth. Water is an integral part and how we manage it is really important. The Water Act sets out the criteria and we need an overarching strategy - this is the start of that.

Rocky Mountain House: March 21

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Feel this is a cyclical change. This statement makes it sound as though we're running out. Don't agree. But we do need a strategy for economic development that takes into account the available water supply.

Firmly believe that in some areas the quantity/quality is not what it was 20 years ago. Don't know what is affecting it but there is a scarcity.

b. Access to safe drinking water will become a significant issue for Albertans

We do need a strategy: most rivers in Alberta are a disgrace - the water quality it poor due to poor water management - used as sewers. We must better enforce regulations in order to work with what we've got.

c. Water availability will limit growth in Alberta

Water allocations have severely restricted growth in the south.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Industrial and agricultural growth, combined with climate change, as well as the nonrenewable use of water, will *together* create significant demands for water.

We sometimes continue to develop where water is scarce.

Industrial and agricultural are two different types of use - one recycles water and one throws it away.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Some sort of strategy is important. We need to define situation and get a sense of the direction that is needed.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

"Effective water management" will not necessarily result from "significant investment in infrastructure." The two don't necessarily go together. Look at what's happened historically and do more significant studies.

If there's a problem, we could solve it by having more dams in the rivers. The Red Deer River valley could hold a lake about 28 miles long - 10 miles wide - and could produce power for southern Alberta. If Saskatchewan gets 50% of the flow, let's keep more in Alberta, solving problems in both power and in water volume.

Don't need large dams.

I recommend that we include Americans in the dialogue because they have the money to build dams - those dams brought the industry that has headed off poverty in some areas. Americans have the capital and the resolve to get it done.

Dams need to become part of the water strategy.

Don't agree with investing in infrastructure. Instead of building a dam to save 30 farms, give the farmers the money and let them retire.

question 3: are there additional challenges?

Don't put water where we can't reuse it and it is lost forever (oil well injection).

Implement and enforce existing legislation, policy and programs. Why are previous consultations (e.g. wetlands policy) or current river basin planning being ignored in this strategy?

Government needs to make industry look at different technologies. Government must enforce regulations that are already in place at this time.

The amount of water being used for oilfield injection is more than that used by Calgary, Edmonton and Red Deer combined every year. Policy is already in place to make companies look at alternative technologies but there is a lack of enforcement. The strategy should be to look to the existing regulations, stiffen penalties and put people in place to enforce them. Such things as water wells drilled illegally or where the soil is not replaced or finished properly creates a problem with livestock contaminating the wells (water).

Not sure whether a new strategy is required or not, rather I think we need enforcement of existing policy.

No matter who we represent, we are all part of the problem and therefore we all have to be part of the solution.

Challenge: Government responding in a timely manner to solve a problem without getting bogged down in bureaucracy.

Provide a number where we can phone in violators.

Non renewable use of potable or surface water for oil injection is a practice we see as a challenge.

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

If you're drinking it, you should be responsible.

It's up to an individual to monitor the supply for his own family. Regulations say we must have the government monitor where there are problems occurring in the aquifer. Problems caused by industrial activity (drilling holes) all over this province. Need to cover up those holds - can't stress enough.

Labs are provided by government - therefore it is a shared responsibility (department of health).

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

Morning Glory Regional Water Association - 11 farms put in system 30 years ago. It's not just putting in the system, it's if somebody wants to add - there are conflicts about new lines over properties. The municipality should be given the authority to force right of entry to allow for expansion.

d. Pump water from distant sources to dugouts during times of drought

Landowner's responsibility. Government should stay out of it.

If one person in an area is affected by drought, surely his neighbours are also affected. They would get together and share the cost. Proper water management would cure a lot of these problems before they occurred.

question 8: small municipal systems ... whose responsibility is it to ...?

b. Monitor the quality and safety of water at small water treatment plants

Shared responsibility. Small communities don't have resources or technologies but also cannot totally abdicate their responsibility.

Municipality should monitor. Province's job to see that it gets done.

Government shouldn't download to small municipalities that have a small tax base. Shared responsibility.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Q. Already doing that - why is it here? A. (Ed) In 1963 an umbrella study delineated aquifers available for use. However, did not cover whole province or was adequately mapped.

Province knows where the water is. Wells have been logged. Snow pack is where they measure the water. Where did all the water studies go? This is well covered - don't spend more money on it.

Not so sure - whatever is missing should be done.

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Disagree with current structure. Feel that with surface water - as situation and demographics change - there should be a way to change allocations. With groundwater: there is the potential of drying up your neighbour's well. Need flexibility: if you have a bigger license, can't deplete your neighbour's well.

c. Allocate water based on its most beneficial, or valued, uses

Who defines value? Looking at how things change and trying to put a value. Value of water goes with the land around it. If we've got water here we should have the right to use it for agricultural uses. If our water is going south, perhaps we should expect from the government the ability to grow corn up here.

d. Allocate water to further uses even if this potentially harms aquatic environments

There is a lack of knowledge about this (allocation, license transfers, etc.). Most of us agreed that we shouldn't allocate if it potentially harms aquatic environments. Do some kind of monitoring.

Definitely disagree strongly. Further, we should have an allocation for protection before any other use is allowed. Ties into items 9 and 10: investigations of open and closed diversions. Definitely disagree for ecological reasons.

e. Set aside water for future population growth before there are any shortages

We must allocate water for population growth.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Do not believe that water licenses should be transferred in exchange for money. No dollar value should be associated with it. Water basically belongs to all Albertans. I realize land value is also linked to water but have difficulty with transfers tied to money.

Q. Are you allowed a license for more than your needs? A. (Doug) License issued for intended use plus a small extra amount to accommodate growth (i.e. a municipality's growth) - have to justify.

Q. Industrial/agricultural applications: can they acquire more than they will use? A. (Doug) They are allowed a cushion for growth. If they need more allocation, they have to apply for a new license with a new priority.

Economies and efficiencies have created excess in some cases. Numbers used years ago for livestock consumption were quite a bit bigger than used currently.

Can see allowing it if user has used allocation more efficiently - even for a price to help pay for more efficient systems. Don't agree where users haven't ever used the water and sell it for a price. Have to watch the whole pricing thing very carefully.

Provincial government should look at industrial use. Where water is used for production of an oil field (floods), the water requirements decline over time. Lots only using 25% of their original allocation.

Water floods: not necessarily a declining requirement for water. Some operations are looking at doubling or tripling water injection in a 30 year old field.

Strongly disagree with the ability to buy and sell licenses for water (commercialization of water). Rather than a person selling their license to someone else - it should be returned to a pool to be reallocated at no financial benefit.

g. Encourage more efficient use of water through pricing to reduce overall use

Handle carefully. Tie education into pricing structure. Effective use of what we have. Q. What is definition of word "value" or "beneficial." A. (Ralph) No definition at this point.

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

Why can't we make weir dams - every 10, 20 miles to catch the runoffs and retain that water? Keep catching it as it flows. Don't need big dams but smaller storage reservoirs.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Following remarks based on assumption that water does not go to another system, or is at least treated in such a manner that organisms are not introduced to another river. This already happens: Innisfail to Carstairs line. It could be investigated but must be handled very carefully.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

It should not be. Introducing one species to another and because it's an open waterway you're actually losing from the source system. Also means that water can be sold to the highest bidder - makes it a saleable item.

No inter-basin transfers.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

This is already happening in a number of applications: municipal reservoirs, reservoirs in agriculture (dugouts). May be a reasonable approach to take but there should be strict guidelines or legislation to control it. Storage of such water should not be available for other commercial use only for use intended (can't sell out the back door when not needed). In cases of provincial emergencies water stored should be released back into the system for those needs that may have a higher priority. Already happening but to expand this on a greater scale needs some control/regulation.

question 11: water conservation options

a. Establish a price for water used by industrial and agricultural operations

For industries that use water than is not returned - they should pay.

Should not allow payment for water - it's not a commodity. Retain it as a resource that you allow people to use, rather than a commodity.

If a young farmer couldn't get an allocation, a retiring farmer could sell his license to him. But industry could also buy it from him. If we put water on the open market and give it any kind of price, the only ones who could afford it will be industry.

Hate to see pricing mentioned.

Water for irrigation is paid for yearly at $14 an acre. Normally get 22" - down to 8". New farmers can get same amount as old farmers the only stipulation being that it be for irrigated land.

Registration of traditional agricultural use: concern about this being a way to tax water in the future.

Don't support this idea. Treat water as a valuable resource and make it available for the public good. Don't treat it as a commodity.

b. Establish a price for water used by individual households

If water becomes a cost, a young family who is not wealthy may not be able to afford it. Someone would receive payment for your living on this planet. Our society has to be very careful about this.

We already have pricing for water (minimum rate with extra paid for anything over). It is one way of promoting conservation. Reluctant to say we should allow selling if you have a surplus.

d. Establish water conservation incentives (e.g. tax rebates) offered by government

Further south, the number of water meters decreases. Edmonton has lots of water but has had meters for a long time. Doesn't make sense.

Industry and municipalities should be encouraged by government to use reuse waste water, rather than dumping it.

Rebates, such as the one from natural gas, should be used to encourage people to look at alternate forms of energy (or water use).

additional comments: about water issues

When you manage the forest, it makes a lot of difference in the water supply. Look into practices that would address this.

No options for water management should be off the table yet (including dams and diversions). Get serious about effective action on conservation and watershed management.

Water allocation and consumptive use: with 57% of natural flow allocated (Bow and Old Man), how are we supposed to send 50% to Saskatchewan? Is the province still going to allocate? The Red Deer River basin does not want to be a donor basin to southern Alberta. We are growing - we need the resource.

AE does not have resources to manage surface water: they operate on a complain-driven basis, rather than by monitoring. By then it's way too late and damage is done.

St. Paul: March 25

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Strongly Agree. Infinite resource but population will be growing. Will have to divide and allocate between larger users.

Global warming may be an issue: glaciers receding.

Strictly because of population growth it will become scarcer.

The area SE of Edmonton right down to the border is very short of water right now.

b. Access to safe drinking water will become a significant issue for Albertans

Is a significant issue now.

No one should be able to contaminate the water sources of others. We have to have meaningful and practical enforcement of regulations. Permitting after the fact should not be condoned (justifying bad action).

Study of arsenic in water. Government has done nothing. Need to do a larger study and provide assistance. Water is priceless.

This is the issue that will drive this whole strategy.

I fear there is a trend that in the future the province wants to change the priority system. Those priorities have to stay. Ecosystem, then domestic use, then agricultural and industrial use. Rob: Domestic use is highest priority. Licenses for all others are by priority in time, not by use. Ecological requirements are written into management plans and allowed for but not necessarily protected by the Water Act.

Should change water management from Environment to a Water Ministry. We need to tie in the ecosystem to all water issues.

c. Water availability will limit growth in Alberta

Two part question: urban growth won't be affected as cites have enough clout to get the water. For industrial growth: development may not take place if not enough water is available.

We often think about moving water to where people are. Perhaps we need to think about moving people to where water is located. Will limit growth if we keep on our current trend.

d. Climate change will seriously affect water flows in Alberta

Climate change is already affecting water flows. Drought conditions in northern Alberta have resulted in creeks, streams and sloughs drying up. Water tables are dropping - wells are in danger. Fewer rains = poorer crops = economic costs. More forest and grass fires - more loss. Wildlife is moving with the water. As more land is cleared there is less water and faster run off. There has to be a tremendous change in water flow in this region, not just southern Alberta.

For this region, climate change model predicted the annual temperature will rise between 7 and 9 degrees Celsius - leading to evaporation and soil moisture loss of 30-40%.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Industry has already made a significant effect on water in the Cold Lake area. Industry will have to truck it in where it is not available rather than use groundwater. How far do lake levels have to drop? What constitutes a drought situation before government takes action? Watershed systems should not be diverted to another area.

Agriculture is dependent on rainfall - few farms in this area do irrigation (usually food sources). Food and people come second after industry. Are we going to have to pay for water? At what price? Some of us have already applied for water licenses. Will that control our growth? If we sublet, will those lessees get a portion of our share of water? Subdivided land creates more water users - will create a huge problem. We should be looking at reforestation to protect water systems. Don't allow land to be completely cleared. Birds and animals need more than flat land to survive. We also need to protect our underground water supplies.

Allocation for water use in this basin for industry is extremely high. Agriculture made Canada. Oil and gas is important too but when those resources are gone, they are gone. We will still have to support agriculture. Potable water should not be used for oil injection.

Preserve surface water by planting trees, stopping clear cutting. Wind and evaporation factors: many sites were not replanted. Plant windbreaks. Take action to avoid evaporation and losing the moisture from snow cover.

Industry is given tax breaks or incentives. Give them incentives to use alternative methods so there is more use for agriculture.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Environmental harm from industrial use shouldn't be an "either or" situation. Sometimes it's a trade off (i.e. a dam creates an alternate habitat). You can have both but be very careful and establish the proper requirements.

Don't believe we have to choose. Two thirds of the water in Alberta drains through the Peace and Slave Rivers. Government should look seriously at retaining some of that water. Hydro electric power dams. Alters surface of ecosystem: Change isn't necessarily bad and enables you to retain the water. Has to be looked at as an overall plan. We have to investigate how we can make both possible.

If you reduce the flow from the Peace River, all ecosystems downstream are disrupted. Choosing economic growth over ecosystem doesn't make sense in the long term even if you have short term gains. Long term consequences may not be reversible. Already seeing such in Peace Athabasca Delta. A dam doesn't make ecosystem sense even if it promotes growth. Shouldn't have to choose between the two. Err on the side of caution: use precautionary principle. Think long-term. Determine effect of development in particular areas. Growth should be determined by the water flow, not the other way around.

Water equivalency doesn't necessarily mean more fish. Fish don't like changing water levels. Sediment can fill a dam. Future generations would have to move a lot of dirt to get any hydro power from dams.

Already too late: we don't know what the baseline is so how can we protect a system we haven't yet measured?

Finding a balance is extremely important. A 100 years from now people will wish we chose the ecosystem over economic growth. Err on the side of protection.

Policy or social issue: want to move toward a sustainable option where we can have both.

Q. How does protection of the aquatic ecosystem fit into the current Act? If the aquatic ecosystem cannot be protected, development should not proceed. We shouldn't compromise the system and then pay and pay again for treatment. A. (Rob) Water Act can set aside allocation to allow us to protect the aquatic environment.

Does the Water Act allow for direct allocation of water to an ecosystem that would be in direct competition for all other allocations? Who is responsible? A. (Rob) We can allocate to the people of Alberta.

Ecosystem is important (goes with #2 - access to safe drinking water). Wetlands cleanse waters. Very important.

Q. The federal Fisheries Act has a policy no net loss of habitat - how does that tie in? A. (Rob) DFO principle for development: providing equivalent habit when necessary.

I have seen the damage a pier can create on Lake Winnipeg. There is damage in Cold Lake from the marina. We need to look at reforestation and cleaning creeks of garbage and pollution. Has to be looked at quickly.

"Choose" - we are now seeing results of bad choices. The ecosystem been around a lot longer than economics. Have to make fundamental shift in our thinking. What do we really want? Economics will likely have to be sacrificed if we want to continue as a species on this planet.

Don't need to choose. If we don't have a healthy environment, we won't have economic growth. Choose that first, economic growth will follow.

In some parts of the world they have realized they can't grow anymore. If we continue to think we have to grow, we will continue to screw things up.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Already is vulnerable. Farmers spray more often now. Industrial use also. Edmonton and Calgary also both contribute pollution to the river during heavy rain or spring thaws.

Q. How can we protect our water from boating and vehicles on lakes. How is use prioritized? How much does it take to pollute? A. (Rob) Doesn't take much to contaminate a fairly large water body. Some natural mitigation systems (soil). Oil spills have happened. The environment does recover in time if cleaned up correctly.

One litre of oil will pollute 1 million gallons of drinking water. Just draining your own car on your own property can pollute your own water supply.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Agree. Already has. Substantial amount of change in landscape and watersheds in it. Has changed flow of water - speeded up run off rates creating extra pressure on infrastructure and ecosystems alike. Need to look at replacing vegetation, etc.

Flood plains are attractive not only to agriculture but also to residential development. Loss is often due to loss of property but it's the gamble you take when you develop in a flood plain. In the U.S., many communities are literally being moved.

Major floods in Alberta were caused by human error: deforestation. Look at the root of the problem.

Flooding can be ecologically very healthy. Cottonwoods are in peril because dams have blocked flooding. Result is rapid deterioration of major riparian systems. Flood plains are very good for agricultural growth zones. Flooding brings in new minerals and other soil supplements. So, although it can be costly, it can also be ecologically healthy.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Agreed. Important to have proper knowledge before introducing new policies. Need proper research to ensure we have healthy, long-term sustainable water sheds. Government may be forced to do quick fixes which may affect the long term sustainability. Education on the wise use of water is very important as it becomes more valuable.

How much water is exported in Alberta? For instance: how much cattle is shipped - they are 98% water. Export beef jerky instead. What about grain that is sold all over the world? Dry it here. If our industries learn to use less water, it's better for all of us.

Knowledge only goes so far and only has so much clout. Need to look to other strategies to make us use water wisely.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Would be expensive. Would fit the dreams of many people to dam northern Alberta and pipe the water south. Disagree.

Can't see government paying for it. Leave rivers to flow as they were intended.

question 11: water conservation options

a. Establish a price for water used by industrial and agricultural operations

We should all pay for our water as long as we get cost of production+ for our products and a wage equivalent to the Premier of Alberta.

Volume discounts for industry promotes increased use of water. If a price is established, don't follow that model. Shouldn't put highest price on lowest water users.

Should be free to all people. Water is invaluable to all life on the planet. The only way to manage it is to acknowledge its value to all of us. Payment is for management and treatment. Promote conservation ethic and apply it to everyone.

We pay an enormous price right now or bottled water. Industry is taking a potable resource (only paying cost of license), using it, and exporting the profit to their shareholders. Agriculture and human use should be separated from industrial use.

Separate industry and agriculture.

We now have industrial agricultural practices - how do you separate those from the family farm? Intense livestock operations use as much water as some major industries.

People are willing to pay for environmentally friendly products. Without sprays, the cost of production is astronomical. Same price for beef in 1952 as we did last summer. Farmers are subsidized by second jobs. Hauling water increases cost of production. Farmers need a union to make a difference, to have a strong a voice as industry. Food costs do not reflect the cost of production. Water costs making it difficult and government doesn't care. We should not pay for water? If well goes dry government should pay for another well.

If we put a price tag on our water supply, will that make it fall under NAFTA? Will the U.S. get the right to buy a river, lake, or stream?

Consumption of surface water: when you use non-consumptive forms of use, price should be set differently than for consumptive use. This would help to ensure people are a little more responsible.

Pay now or pay later. Set a fair and reasonable price now or the next generation will suffer. Have to think long-term.

Q. What makes the province think they own the water? A. (Rob) Province has an act of legislature to manage the water in the province.

Would landowner be charged for water collected in a dug out? Most farmers are concerned about water. Hate to see price established for household use.

Insulted by these questions. Government creating a foot in the door to eventually sell our water to other powers. These questions were answered 10 years ago.

b. Establish a price for water used by individual households

We all should pay. All operations - all pay same price - use more, pay more. Should have to clean the water after it's used. The more you dirty it, the more it will cost you to use it. Will result in better management practices.

Meter water flow and adjust prices accordingly. Use it more wisely. Incentives to industry to use the water more efficiently.

Major concern with charging everyone for water. Hauling water around will cost more than it will generate. Conserve water, clean up water when it's returned to the system. Will cost more to regulate than it will generate.

Have to differentiate between urban and rural household use. Urban use is out of the tap. Rural use can cost up to $10,000 for a well, plus dug out, power to run the system. No comparison.

How do you control water? What constitutes a farmer?

No individual household pays for water. We pay for pumping, treatment and distribution. Agree with establishing a price for industry and agriculture but you can't apply it to individual households - it would be a burden and how would you enforce it?

People would die if we start charging for water. When will they start charging for air?

The fear of pricing water is that we will come under international law and there will be great pressure to export our water. Water is an important resource: consider it sacred.

c. Educate Albertans about water conservation values and methods

Education needs to continue: frustrated with government. These forums are repetitive. Feel economics is the bottom line rather than long term management goals.

Use more creative methods to educate kids (i.e. partner with McDonald's [restaurant]).

Water is a very important natural resource that has to be protected.

Government should provide incentives and encourage the use of devices that save water.

Start with children in classrooms.

We have been educating for over 20 years. Agree it's important but this statement implies it hasn't been done - when it has. Don't know if it has lead to water conservation.

This point is tied to point 2 [establish a price for water used by individual households]. If you don't price something of value, people will take advantage of it. Those who choose to be good should get incentives. Those who choose not to be good should be penalized. There are stumpage fees for forestry. Taxes for a resource. Education costs something. The question is who pays and how much? Too much time is spent on worrying about 5-7% of water consumption: larger users need to be looked at.

Educate adults: there should be a cost associated with such things as draining wetlands.

This point leads to point 4 [establish water conservation incentives] and takes us back to point 2 [price for individual households]. Money talks. People pay more attention. Fair price has to be set - less for rural, more for urban.

I wasn't educated in high school about conservation (only blue box recycling). Kids are an unused resource: get them out there checking water levels, replanting trees, become more responsible - they will learn to care more.

Funds from pricing could be set aside to clean up messes made in the past.

We tried alternating days for grass watering. It actually resulted in using more water because people felt compelled to water on their given day. Government should investigate proven methods of conservation to assist municipalities.

These workshops could go into schools.

Great idea. Should have an energy efficiency branch in government.

additional comments: about water issues

Q. Water Act: what are implications of establishing a price for water (NAFTA)? A. (Rob) Don't know.

Resource has to be recognized and enhanced, not degraded. AE keeps changing the bar of what's expected. Have to put in elaborate systems to deal with hypothetical situations. Technology will not win the battle, rather serious thought to long term management of water bodies. Counts are rising quickly. Treated water that runs through system helps keep people healthy. Source protection and watershed management is hugely important and should become the priority for the province. Spending money to update treatment plants is more expensive that looking after the source.

Will government listen? A large hog operation (180,000) that was denied approval in St. Paul and Provost was approved in Beaver Lake (bird flyway, habitat). Federal - Kyoto - province says no. I'd sooner breathe clean air than have a better economy. Have to draw line somewhere.

Get your well fully tested now. What happens upstream from you is very important.

additional comments: about water strategy process

Government did this same thing 10 years ago.

Why hold meetings during calving time? Most farmers cannot attend.

Fort McMurray: March 26

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

All agreed. Gas plants and oil plants booming in this area will affect our resource.

Some parts of Alberta may be worse than others. Q. Is this the reason we're here today? A. (Ralph) No. Minister wants a provincial water strategy. Water management plans don't have provincial scope. Also, strategy is province-wide in terms of departments involved.

It's a global issue, not just a provincial issue. Statement needs broader scope.

It's a problem internationally - global warming. The word "resource" puzzles me. Implies we are recognizing water as a money-making business. Because of impacts in the NE region of the province, we need more work on maintaining clean water for future generations. Any adverse effects will harm all wildlife, fish, our environment - water is the most important element in our lives.

As First Nations, we have to deal with the federal government. Recommend that you meet with First Nations communities as part of this process.

d. Climate change will seriously affect water flows in Alberta

"Will" should be "is."

If water flows are reduced in southern Alberta because of climate change, will they be clamouring for our water to be diverted there?

Government allowing cutting down of trees (ALPAC) causes the problem.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

We probably use more water per capita than Europe does. We should use their technologies for conservation.

g. Surface water and groundwater will be vulnerable to pollution and contamination

This is happening now, not a future issue. We should be acting now. Government should help us prevent pollution in our area (Conklin). Don't want to wait until water is unsafe for our children. Eventually industry will pollute the lake (Christina). Need to educate our children - inform them about how to protect their lake.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

May never have a flood again in this region. Flooding would only come from BC Hydro. Would have to have quite a bit of ice on the river to create a flood.

Bennett Dam: if it ever let go, the whole Peace River territory will be under water. There's 200 kms of backwater - a hazard for humans.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Utilize traditional environmental knowledge from First Nations to enhance understanding of what water means to us. Should be included in all workshops throughout the province.

Has always been important - should have been recognized as important before now.

Water has not been used "wisely" since the economic boom (Leduc #1 well). Economic growth is spoiling our environment and Aboriginal people are allowing it by not acting on it. We have lots of traditional knowledge. If you want to be "wise" - ask the people who know.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

What is meant by that? At whose cost? Are there plans for more dams?

question 3: are there additional challenges?

Where does tax come into this discussion? Will water be taxed?

Can't prioritize these challenges - you must consider all of them, and more as it continues.

When water rights under the 1930 natural resources agreement were transferred to the provincial government, there was no consultation with First Nations. Nor was there effective fiduciary responsibility to the people, First Nations or other people who inhabited the land.

Challenge: Need to address trans-boundary issues with other provinces and territories.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Very expensive proposition. Used to get water at 65' as a boy - now go down 200' to 700'. Just to determine the reserve would be cost prohibitive.

How can you build an effective strategy without knowing the inventory of water available?

Is the technology even available that allows us to determine the amount of water underground? Could you also identify how far those aquifers go - a heavy user miles away could have a large impact on the amount and quality of that water.

Don't know what the oil and gas companies are doing underground. Shouldn't allow pollution of groundwater, where will we turn when surface water is gone?

What about focussing on rain water - accumulate over summer?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Dangerous - current users may end up having a greater allocation than they really need. They may never use all they have a right to. Could have a negative impact on a new potential user or even an existing user that needs more water capacity for legitimate reasons.

With the developments in this area, there's not much water available here - all are striving for the water. Don't think it's fair. Many people have been here longer than the industries who don't have a license to the water: including plants and animals.

c. Allocate water based on its most beneficial, or valued, uses

Who determines?

d. Allocate water to further uses even if this potentially harms aquatic environments

Absolutely not.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Disagree. Could they transfer to the states?

For how much? Licenses could become very valuable given the market.

g. Encourage more efficient use of water through pricing to reduce overall use

Oil companies don't pay a price for what they take out of the ground (except for royalties). You have to make the distinction of whether you're selling water like a litre of gas at the gas station or just charging a handling fee (like municipalities).

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

Problem is you have to flood large areas: you may be flooding sensitive areas, farms lands, etc. Not a great option.

In some instances, it can work quite well. Can be important to a water user to store water during high flow periods - could lessen impact on overall environment of a creek for instance.

Already a low flow of water going into Lake Athabasca - river has gone down drastically. Storage reservoirs will further affect flow.

Quite hard to save water without any snow. Without snowfall in mountains, there won't be any runoff. Waste of money to invest in storage reservoirs. Have to just live through drought.

Large companies can store a great deal of water which would lessen the availability and drive the price up.

l. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

The scale of such operations scares me. 50,000 barrels a day would cripple our river systems.

What steps would be taken to keep water safe as it travels from one destination to another? Who makes decision about where water comes from and where it goes: federal government, provincial government, the public?

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Bennett Dam has destroyed downstream users. Large scale projects seem to be used, rather than small ones. Don't agree with these last three options.

Syncrude has a lake, not used for anything else. Industries are already doing this.

Add your own example ...

If we transport water - what will happen to our fish?

Water is also a means of transportation for us to bring in our freight. If we divert - we must be guaranteed (as members for Fort Chipewyan) that we can still transport food at a reasonable cost. Expenses are going up as a result of taking water out of the river system.

question 11: water conservation options

a. Establish a price for water used by industrial and agricultural operations

Those industries who pollute the most should pay the highest price.

May jeopardize FITFIR - richer companies could get more water than poorer.

Industry are more able to pay a higher price. Will that take priority over residents?

Who will be setting the prices for industry? For their licenses?

The agricultural industry in southern Alberta is one of the biggest users. Pricing water will make some of those practices uneconomic.

b. Establish a price for water used by individual households

Concerned about people who are unable to manage with high cost of living here. Water is a necessity of life. A better idea would be to set a limit based on the number of individuals in a household. Once past the limit, then you would be charged.

Many households already pay for bottled water. Individual households are not the polluters - not as heavy as industries.

Hauled water hauled is recorded and metered. I make sure my children know how much they are using. It does make us more aware.

c. Educate Albertans about water conservation values and methods

Place a lot more emphasis on educating people and ensure people are aware of what is currently available for water saving devices. Encourage people to use them.

Government needs educating.

Educate industry on the use of their water.

d. Establish water conservation incentives (e.g. tax rebates) offered by government

Treaty 8 - we don't pay taxes. Turn off water if people go beyond reasonable use (wasters).

e. Set targets for water conservation for various sectors using best management practices

Setting targets allows them to manage water but don't appreciate the value of water in the first place.

Add your own example ...

Conservation needs vary throughout province.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

If the province determines, will they let the public know?

Province should determine how much water is left that is still healthy. The water we drink is treated but am concerned about the wildlife that lives off that water.

b. Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin

Essential. Although we would like a pristine environment we have to acknowledge that economic growth gives us the life we enjoy. Doesn't need to be a trade-off - we can achieve a balance if we commit resources to find what it is.

c. Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm

Some lakes have already died (N. Ontario). Don't want to see it in our region. This is a global issue, not provincial. Conservation is important. Experiencing global warming and pollution - there are no boundaries. Mother nature does its own management, but we need to do likewise.

Why go with the maximum? Why not find the minimum?

Concerned with the amount of development that will occur in our area over the next 30-40 years. Government has to tighten up on policies.

Government should look at the impact of cumulative or combined effects of pollutants in water (time bomb).

d. Identify sensitive aquatic environments or habitats that require additional protection

Athabasca and Peace River Delta - prime example of an area that needs additional protection. Most Albertans don't grasp the concept of an aquatic environment. We that live in the Delta are trying to protect our ecosystem.

f. Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use

Agree. There's a relationship between item #2 and this one. We must maintain the aquatic environment and human use may be limited.

Who will determine? How will they be implemented? Rules established to date (special places) were an exercise in futility. Need to do a diligent job putting in meaningful rules and regulations. Applies to many of these issues. The Athabasca Peace Delta is an example of poor diligence.

If other areas have more attendance, they will have more input. Is the input in each area important? Are we at risk of losing our water to the south with not many people here? There's more farming in southern Alberta and they probably feel they need the water more than us.

Rather than limiting human use, what about the water that is exported to the states?

How do we support the province, when they don't support the Kyoto initiative?

additional comments: about water issues

Plant at Christina Lake: I have to trust whoever is testing the water samples. If I tested it separately and found it to be polluted, would Alberta Environment support me? A. (Pat) If pollution is a concern: there is a hotline. Even if you only suspect, you can still call. Q. Are these places paid off by big industry? A. No.

Putting a cost issue to a lot of these questions. Water is taken for granted by Albertans. Conservation issues have to be seriously approached and take into consideration development, water systems, quality of water, quantity water. Can't answer many of these questions as I don't consider water a product or a resource. What about air - is that next? Albertans should be concerned. Many consultations have been shelved over the years.

Feel uneasy. Don't support some of the options. Do support conserving water. Water is required for life. We try to maintain our livelihood through traditional uses. There has been a tremendous change in the last 40 years in this region. Our livelihood is rapidly being destroyed and our region polluted. I don't trust the government to determine how I should live. Resources are part of our land base, and if people are taxed it's because they use the resources. Don't come and tax me now on a resource I need to live. Industry is greedy to the extent that land is damaged. Haven't seen this government do their job in protecting our environment - rather they are polluting it. Need agreements between the two levels of government and the First Nations.

How does province deal with the rivers flowing to other jurisdictions if conservation methods are put in place? Are there agreements between provinces? Are other provinces doing the same thing as Alberta? A. (Ralph) Some agreements in place. Commitments to provinces downstream. Don't have agreements with BC and NWT at the moment.

BC Hydro: many rules and regulations were disregarded when dam built. Government determined that jobs were far more important than consulting with people and issuing licenses. Critical that we have input into how regulations are written.

Back off and leave rivers alone - done enough damage.

Q. Are water rights part of free trade? A. No. However, there are cross-border agreements about the rivers that flow to the states.

Q. Does provincial or federal government have the final say on water? A. (Pat) Administration of water was transferred to the provinces in the 1930s. There is a potential for the federal government to assert their authority over the province but they would need justification to do so.

Northern Alberta is a wonderful place we call home, biggest fresh water delta in the world, biggest national park in Canada. This is our homeland, our reserve. We've long been ignored although we've spoken many times in these hearings. We talk because we care and we want to protect our area for our children. Industries will pack up and go when they're done and leave us with this mess. This is global and it will affect their children too. Have to listen to the little guy as well as big industry. Everyone needs water. Other parts of the world will be crying for water - an international issue.

additional comments: about water strategy process

There should have been more time and this information should have been sent out to every household in Alberta. How will you get a broad perspective from all Albertans from these meetings? It's a concern.

Rivers used for subsistence by First Nations: fishing, transportation, travel. Drying up or diverting water will impact those land uses and local economies. Make sure that First Nations are consulted properly, particularly traditional land users.

Don't consider this a consultation process with Albertans.

Challenges are too open - not worded well. Hard to provide input on some of these challenges.

Q. Will there be a response soon? Will you be coming back? A. Similar meeting to be held with Grand Chiefs in April.

Request a meeting in Fort Chipewyan. Have phoned MLA (since Calgary is getting another one).

Grande Prairie: April 2

question 1: what are the challenges?

b. Access to safe drinking water will become a significant issue for Albertans

Already an issue, although less here than in other parts of province. However, potential to be a problem is still here. Low water tables create need for alternate sewage disposal system. Monitor industry and agriculture re groundwater contamination (animal waste and chemical). Industry seems to be acting but not sure how effective they are. How does average citizen find out?

AE doesn't have enough staff to monitor the environment. The industry monitoring itself is disastrous. Needs to be rethought.

c. Water availability will limit growth in Alberta

Industry and agriculture have already been limited. Agriculture in south would like to irrigate more land than they already do. In Sexsmith, water is already over-allocated. Have to decide whether or not growth is always appropriate.

Water is not over-allocated in Sexsmith. Industry taps into potable water from the reservoir and use it for well injection. It's easy for industry to pay the insignificant fines.

We have 80% of the water, but 80% of the people are in the south. Big issue is how water is used by the big users.

Economics affects water use. Sexsmith allows industry to use the water because they need the tax dollar generated by industry.

Where there is societal benefit, we should provide some returns for those who maintain water on their land (i.e., maintaining wetlands). Recognize the inherent value of water and factor this into the economic equation (so it is not purely profit-driven).

Old Man River dam serves 107 farms: quite an investment for a small number of people. These decisions are not driven just by economics - they are also driven by political will.

d. Climate change will seriously affect water flows in Alberta

Unsure about the wording "will seriously affect" - there may be some effects but not sure they will be serious.

The climate is always changing: the difficulty is understanding what the effects will be. We are dealing with a lack of basic science right now.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

This area has a significant problem with water that is already impacting industrial and agricultural growth. Seasonal changes from year to year in water flows.

This assumption is clearly related to the Minister's comments about diverting water from the north to the south where growth is occurring.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Can't consider this alone without #10 (work hand in hand). However, it won't require major investment: suggest they use small dams 8-10 feet high to slow down water. Reforestation is also required: logging has ruined rivers.

In order to be a sustainable system in the long term, these two elements must work together.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Currently happening. Mortgage companies already asking for wells to be tested before granting mortgages.

Knowledge and education also an important component of this question. Need more knowledge about groundwater in the Peace country. Land uses have an impact on surface and groundwater. Need more research into how these impact together.

Impose current regulations, rather than make new laws.

Strategies have to be driven by non-economic public decisions (although industry should be part of the discussion).

Our creek has been polluted by a couple of feed lots. There's no law in place to protect us. Way behind the times.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Unsure. Many floods to date have been from natural causes: haven't been that extreme. Shouldn't spend a great deal of money on it right now. However, human causes such as clear cutting can create problems. Forestry is responding and should try to curb the practice in the future.

Cochrane: $400,00 homes lined up on flood plain. The province should forbid construction in such areas.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Already important. We need more knowledge about the use, reuse and proper allocation of water.

Will political decisions be based on knowledge?

Improved technology will result from more knowledge (assist in wisely using resource).

Already educating. More knowledge will take us further.

Disagree that we're doing an effective job of educating. I received more knowledge about water than my kids are getting now.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Not big projects: prefer assistance to municipalities to conserve water. For instance, a high percentage of water is used to flush the system (takes out magnesium and iron) and then becomes waste water. Assistance with a settling pond or other system might be beneficial.

Disagree. Might be more cost effective to invest in conservation, education and improving technologies.

Perhaps investigate multiple pipe systems. Then we could deliver different types of water for different uses.

Dams for irrigation and hydro electric power can't function unless reservoir is full. Doesn't prevent flood damage.

A dam is a poor use of funds - shouldn't be constructed.

question 6: private systems ... whose responsibility is it to ...?

Add your own example ...

Add another level of responsibility: the industry that may be responsible for polluting the water - they should assume responsibility.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Learn from Aboriginal people - they look ahead 7 generations. What's the logic in changing a process that works? I personally don't know if it works well. Only know that if you overload a system noone makes any money.

This discussion doesn't actually reflect thinking about the future.

FITFIR seems a poor system.

FITFIR: could it allow someone to pull from another basin to fulfill their right? There are more voters in the south so they may be able to change the system whether we like it or not - there is no democracy.

c. Allocate water based on its most beneficial, or valued, uses

Who establishes the value? How much input will people of province have?

Consultation has to be ongoing to provide continued input from citizens into what the values are. Society should decide if certain uses override FITFIR. We would also have to compensate a person if water is taken away for a "higher" use.

FITFIR accommodates #5 (set aside water for future population growth before there are any shortages).

e. Set aside water for future population growth before there are any shortages

If we're short of water - how do you set it aside?

Can't store water.

Q. What about the apportionment agreements between us and Manitoba and Saskatchewan? A. (Rod) We agree to allow 50% of predicted flow to continue over the border.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Q. Does transfer mean "sell?" A. Yes it can. You can sell your right to the water.

You should be allowed to lend it to someone who needs it.

It's difficult to get new licenses (regulatory process), so why not transfer an unused allocation for instance to a municipality that could use the right to the allocation to expand their system. It's a possibility. Not a totally negative scenario. Take a close hard look. Could happen to the benefit of society.

Has to be some limits to avoid people sitting on their land rights.

If you are no longer using an allocation, you should have to transfer it - but it should go to a like use (agriculture to agriculture).

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

Allocation should match the amount of water available. Protect the old licenses.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Currently in place - already been done.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Ecologically, dams are a problem, plus mixing water is a problem. Who pays for the expense? Would need a whole series of dams plus canals, etc. Again, a huge expense to assist a relative small number of farmers.

Very much against. However, if the majority of people in Alberta agree to divert water, it will probably happen (more people in the south).

Disagree that little information exists on cost (as stated in workbook). There have been years of study.

question 11: water conservation options

a. Establish a price for water used by industrial and agricultural operations

Not an incentive as the cost is just passed on to consumers.

We're in this together. We're all part of problem. Need to be part of solution. Government should be there to help us.

b. Establish a price for water used by individual households

How can you monitor people who use water from their own sources?

c. Educate Albertans about water conservation values and methods

Education is the key: have to educate from elementary through all grades.

Compared to Europeans, we have little knowledge about how to use water. Although a renewable resource, there's a limit to how fast you can process it to use it. Learn from others.

Educate people to use water wisely at home.

In July, people were consistently getting water in their basements. We researched the problem and let people know it was caused by over watering their lawns. We saved thousands of gallons of water by researching and letting people know.

e. Set targets for water conservation for various sectors using best management practices

Already incentives for air pollution - hasn't been effective.

Add your own example ...

Are we using water properly? Most water is used for irrigation. Is that the wisest use of water?

The oil industry uses groundwater for well injection. Is that wise use? Perhaps we don't need to conserve but rather use the water wisely. Are we targetting the right areas?

additional comments: about water issues

Lake water depth: we are not able to swim in the lakes anymore - weir management would solve the problem.

Peace River: April 3

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Not in all parts of Alberta - probably in the south. One solution for all areas won't work.

Can't answer: climate changes are cyclical. Today, may be drought - tomorrow could be flood. How does answering this help the Minister make a decision?

We're seeing some indications of problems that may become scarcities but not close yet. There's a lot we can do (no flat rates for water, incentives for using water wisely, no inefficient irrigation systems) to use water more efficiently before it actually becomes scarce.

b. Access to safe drinking water will become a significant issue for Albertans

Very concerned. Many farmers use pesticides and herbicides that poison water. Gas and oil industry also affects water.

More of an issue in small urban areas as they can't afford the technology to treat water properly. There will be more of large centres like Edmonton piping water to smaller centres.

A lot of regulatory policies now in place concerning health issues and the safety of water. More concerned about the assessment of the big picture so we can then plan for future use - which we don't have now.

Potable water vs. drinking water. Clarify the definition. Potable water means drinking water but, according to municipalities, means treated water. Should be able to get (haul) good drinking water, as well as treated water.

Statement infers that safe drinking water is not an issue now - but it is. Walkerton has affected the way we think about treated water.

Chlorine in water: is a poison. Especially for women (breast cancer). A real concern to me. Would rather have safe untreated well water than treated water.

d. Climate change will seriously affect water flows in Alberta

Yes, am concerned.

Climate change is a natural thing that happens - not necessarily "serious."

It may go beyond what the government can control if it gets severe (i.e. no snowfall means no river flow) - doesn't matter how many dams you build.

Educate people to help address and manage for climate change: water conservation techniques, research into ways the oil industry could use water more effectively and technologies to manage the water we do have during times of shortage.

Kyoto agreement: Premier against it because it curtails industry - an ignorant comment. Be more creative: there are industries that could be accommodated within Kyoto.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

An important issue in terms of overall water use in next 20 years. Industrial/agricultural growth in combination with population growth may become a critical factor in some areas. Conservation will become very important in places like Lethbridge, Medicine Hat. We have to try and steer some of the growth that requires water into areas where there is plentiful water.

Part of the problem is that the highest use is in the areas where there are shortages.

Government should keep in mind where water is available when approving industries, rather than moving the water to the industry. Also, better control how water is used - to avoid pollution.

Also have to recognize that some things aren't transferable: can't grow sugar beets in Peace River. However, some crops do well here or can be adapted without irrigation required: canola, alfalfa.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Not a choice between the two: need a sustainable aquatic ecosystem in order to have economic growth. Goes together.

What does government mean by growth? Diversifying our agriculture and finding other sources of energy also means growth to me.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

It is an issue but the town has already protected for it to some degree.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Need more information about underground water systems. How much water can we use out of our aquifer and still have it be sustainable? Don't currently know enough to determine whether we can add an industry to the users.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

I question whether the province should spend that amount of money to support a relatively small industry. Moving agriculture north has some strong merit.

question 3: are there additional challenges?

The water needs for individuals, families and recreational use should be a high priority.

Our water use is horrendously inefficient. Europeans use only a fraction and yet their economies still thrive. We can do better.

question 5: where do you get your water?

Private 7

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

Individual's responsibility.

There is a shared role if you have the water tested. Access to testing.

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

Sometimes government intrudes where it shouldn't. It should be the choice of the people.

Municipality could play role.

Berwyn gets untreated water from an aquifer. Don't need to treat it - it's tested weekly and is excellent quality water. Because of definitions in the Water Act it becomes a problem because it's not treated. This is something that has to be addressed.

Q. Why do we need to treat water if it's perfect? A. (Dave) For water that is piped, it reduces risk. Pipelines can break or leak and be contaminated.

Untreated water is also potable water - it is drinking water. It could have a warning on it: drink at your own risk - but people should be allowed that choice. Don't legislate that potable water has to be treated. People should be able to choose.

d. Pump water from distant sources to dugouts during times of drought

Municipalities and provincial government are already involved. Large amount of money invested in equipment that is only used rarely. Helps individuals. Shared responsibility that should continue.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

There is a priority built in for human use. However, for other uses, it at least avoids conflicts - is cut and dried.

Concerned that a feedlot that may not be considered beneficial could have first right to the water.

Q. What happens if an aquifer's water level drops? A. (Rod) they starting cutting back on use - newest licenses are cut first.

Is it possible that the first license could be a very inefficient user and other users - even if more efficient - could be cut off? A. Yes, although you can't use all the water you want - a dedicated formula is used when you receive your allocation.

Seems there's little incentive for the first license holder to be efficient with his allocation.

c. Allocate water based on its most beneficial, or valued, uses

Who will judge? Will create never-ending conflicts.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Dangerous situation. Someone who is willing to pay could buy up the right to the water - not necessarily for a beneficial use.

Why doesn't government provide incentives for people to conserve water?

Government needs to instill in people the value of water. Government shouldn't have to pay incentives.

Make it economically attractive to conserve water.

Q. What happens to the extra water that is allocated but isn't being used? A. (Rod) FITFIR does allow people to predict growth. Water not used is not wasted, it's still in river flow. (Ralph) If someone is wasting water, the government can step in and adjust their license.

Q. Do southern municipalities have water meters? A.(from participants) Medicine Hat and Lethbridge do. (Bill) Calgary has just passed a motion to move toward meters (2009). About one third are on meters voluntarily.

If an oil company is the first in time, and the water is deep well injected, the water is gone. In that case, FITFIR is a disaster. Plus oil companies have the money to buy up licenses, etc.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Do not agree because if and when water table rises you'll run into problems. Can cause a lot of ecological problems. Storing water would be a better system.

As soon as we talk about diversions, Americans will be standing in line. Would fall under NAFTA. Don't open Pandora's box.

Americans monitor water in southern Alberta very closely. Are very aware of any diversions that would affect the flow into the U.S.

Major diversion was investigated during the Lougheed years - the cost was astronomical.

American are willing and able to pay for diversions of water.

Economics resulted in the Meridian Dam being turned down. A pipeline to southern Alberta would be equally unfeasible. Economically and environmentally ludicrous.

Suggested to southern ranchers that they move their cattle up here, rather than moving the feed down to them However, these days they calve all year long and because our winters are two months longer than theirs it means more cold weather for them to contend with.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Yes, if it's economically feasible and at their own cost.

The amount they could store would have to be factored into the licensing and allocation process.

Depends on how big the water storage becomes: how much is greed (how much would they sell it for)? A. Still only allowed their allocation of water.

question 11: water conservation options

d. Establish water conservation incentives (e.g. tax rebates) offered by government

Opposed to incentives. Rather, use disincentives - make it costly to waste water.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

Would take a lifetime - whether you come up with the right answer is questionable - there are so many variables. Easier to do on a smaller scale, but looking at the big picture it becomes more complex.

The term "healthy" is a tricky one. A subjective word. Difficult to determine what parameters to use. You also have to decide the level of aquatic environment you're willing to live with/without.

Without this knowledge, you are shooting in the dark. How can you manage effectively without it? Managing effectively eliminates the requirement for many of these other strategies such as diversions. It's a lot more expensive to build infrastructure and diversions that don't work than to do the required research.

We do need some information but will run into problems because nature doesn't stay the same. Who could have predicted the drought? What priority will you put on the maintenance of the aquatic environment compared to people needing water to drink in Lethbridge?

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

A good idea. May be a challenge.

Without the knowledge, if we lose a species, we don't even know what we have lost.

The way to go for the future. May even have to restore some of what we've lost in order to maintain healthy watersheds. Relates to first item (determining how much water the aquatic environment requires to remain healthy). We also need to know the interrelationship between wetlands and river systems, etc. and how much water we need in our landscapes and how it relates to land use management.

We all have to face facts and look at it scientifically. But sometimes dollars override our decisions and we don't deal with issues until we have to.

Sloughs filter water. A lot of farmers are more knowledgeable than previously and realize the importance of sloughs and wetlands.

f. Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use

Many variables affect the water systems (temperature variations, rains, snow pack). Need more information in order to better use water and take care of it.

Have to do something to maintain a balance in the system. If we drain sloughs, we don't always know the effects. In southern Alberta, many aquifers are not being replenished because we have drained the surface water. In the long term, it will be important to maintain these wetlands.

What other preventative measures can we take? Use common sense. Use our knowledge of the water system, of those people who have being using water systems for years. Judge every issue and region on its own merit.

There is a lot of variability in the weather from year to year. Some years are dry enough that sloughs dry up on their own. Sometimes we start to change our water use based on one or two year's activity - not a good idea. Aquatic ecosystems will have to adapt to generally changing conditions.

additional comments: about water issues

How much water in Alberta is going down deep well injection holes? Need to know where that's happening and how much is going on around the province. EUB reports on this but information should come to AE as they will have to manage the whole strategy.

Q. Has AE done a study on the Peace River to determine how many dams it can handle in a given area? A. (Tim) Some studies available regarding proposed dam in Dunvegan and also at ferry crossing upstream from town. Not aware of any that have determined how many the river could handle. Information available at AE office.

Building dams has less to do with water irrigation and power generation and more to do with political ego.

additional comments: about water strategy process

Challenges: can't agree or disagree - statements too sweeping.

These sessions are a good exchange of ideas but I am concerned that this will end up in a black hole.

Will end result be determined by the number of check marks in this workbook? If so, it becomes a concern for those in northern Alberta (less population).

High Prairie: April 4

question 1: what are the challenges?

b. Access to safe drinking water will become a significant issue for Albertans

Goes hand in hand with 1g. More industry in the area is a concern for water quality.

Goes with 1g [vulnerable to pollution and contamination]. If you don't have clean drinking water, you have nothing. Education (1i) is the way you keep it forever.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Concerned that decisions have already been made. Where does province draw the line between sustaining economic growth in the south and protecting the environment in the north. Will our voice be heard? We worry about being railroaded by the majority and being left with a dirty back yard to clean up just so southern Alberta farming can continue.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Quality of water in our region is a major issue: the relationship between industry and water quality. The change over the years has been drastic. We've had to deal with oil spills and pollution from Swan Hills that have affected our water.

Projects are approved and permits issued in isolation. When approving anything in this region, the cumulative effects of contamination should be considered.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

It's ludicrous that municipalities in southern Alberta don't meter water. Also, probably twice the volume of water going into irrigation would actually get there if proper maintenance was done on the systems. Lots of issues for people in the south that need to be addressed.

question 3: are there additional challenges?

Let's get to the point: Minister is from the south - this is just a grab for water.

Sustainability of ecosystems in undeveloped areas (which is most of northern Alberta, B.C. and Saskatchewan): if you drop the water table dramatically, it will affect those ecosystems.

question 2: indicate the three most important challenges for the Government of Alberta to address

b, e and i

b, g and i

b and i

question 5: where do you get your water?

Private 4	Small Municipal 35

question 6: private systems ... whose responsibility is it to ...?

a. Monitor the quality and safety of the water supply for private water systems

I see no mention of protecting ground water quality. An obvious thing to look at: cross contamination of aquifers, steam injection, etc. Seems suspicious that it's not mentioned because it is an issue across the province.

I believe the legal interpretation is that if you own it, you're responsible. Following the transfer from the federal government, the province claimed to own all the water so they are responsible for maintaining the quality.

In order for private systems to continue we need someone protecting the sources: rivers, lakes and streams. Also, municipalities don't have much say in some of the industrial development which could potentially contaminate their water. Province gives these approvals so they are responsible as well for any contamination to an area.

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

Environment doesn't enforce water quality regulations as much for co-ops with treated water - so we are therefore running at a higher risk should the lines be contaminated.

question 8: small municipal systems ... whose responsibility is it to ...?

a. supply technical advice to small municipalities about facility operations, maintenance and monitoring

Province is incredibly hands-on with providing advice (Internet reports can be done daily now, they specify the requirements for testing). Whether they're enforcing them or not is another question. We'd actually like more money to operate. The rigour of their enforcement mechanisms has certainly increased since last year.

The problem is that municipal councils rarely see training of operational staff as a priority so it should be a requirement tied to the grant for the facility that the staff are trained appropriately to run the facility.

b. Monitor the quality and safety of water at small water treatment plants

Funding is 75% from provincial government and 25% from municipality for systems in small municipalities. Province should play a role in seeing how these systems are run. A. Those facilities are approved by AE and have standards and regulations that must be followed.

c. Develop regional water supply systems

Do have regional systems here. Think it works well. Provides some economies of scale.

Regional systems are a good thing: running lines to smaller communities that don't have the resources to operate their own treatment plants. You could put in a huge water line for this area (Peace River, Slave Lake and High Prairie) and delete all the little systems. The bigger the system, the higher qualified people you can get. Some of the hamlets are doing the best they can but don't have the resources. Definitely at risk.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Sounds like a good idea, but worried that we don't know enough about the intricacies of groundwater work right now. Worry about drilling into it, etc. A slippery slope to start down (investigating becomes a report that becomes a plan, etc.)

Believe there is a potential to start looking at groundwater.

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Have no problem with it.

It may not be the best way just because we have always done it that way.

FITFIR has a lot of problems. Mostly applicable to southern Alberta when dishing out irrigation potential. What makes the original farmers more important than my generation?

Both methods carry some merit but concerned about what value is based on: cosmetic use or survival? Who decides what is a bigger priority or value? FITFIR at this time seems like the only protection I have at this point.

c. Allocate water based on its most beneficial, or valued, uses

Money would control who gets the water. Shouldn't be touched at all.

Think municipalities should be first and then others after. Water for people has to be a priority.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Q. Is it true in the States that where water is tied to the land, the right to the water is now more valuable than the land itself? A. It's possible.

In northern Alberta (Little Smoky, Lesser Slave Lake, Smoky River, Wapiti) sometimes licensees are cutoff when flow is down.

g. Encourage more efficient use of water through pricing to reduce overall use

People will consume less water if it's metered. Also, unfair playing field: if municipalities bought water, there's also an incredible added cost to treat the water for consumption. However, for oil companies that would buy it and put into the ground - they don't have to do anything more with it. Municipalities couldn't afford to use water for anything but drinking water.

People waste water.

If all municipalities had a good conservation plan in place, and put meters on, consumption would go down quite a bit. All kinds of technologies and techniques are also available.

There should be a charge for water. It costs millions of tax dollars to put systems in place. In the north, many systems are put in by private individuals. Providing water for use by livestock and then turning around and having to pay for it.

To get the best bang for your buck, aim it at the 70% use [irrigation]. What can we do to make that system work better? User pay?

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

Reservoirs have their place - just part of prudent planning. There should be water there if it doesn't rain. Should be investigated. However, they have to be careful about what they may screw up as a result.

A good suggestion. If it had been done at Slave Lake we probably wouldn't have to have had siphons over our weir. Often that water just runs off.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Skeptical about any transfer. A good year may be followed by 3 or 4 dry years. My experience is they can't stop at just "investigating" - so don't even start.

"Investigating" would be the first step down a slippery slope. What's the point in studying it if you're not planning to do it? Politicians have a way of taking an idea and then it's happening before we know it (pressure from constituents).

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Is that not what a lake is? Where could you store enough water to supplement the level of Lesser Slave Lake?

Don't think it's realistic or practical as it would be such a large undertaking. Then, if we had wet years, the water would never be used anyway.

There has already been activity like this on Lesser Slave Lake with a pipeline to Swan Hills. If the pipeline still exists, what's stopping other companies from using it?

If the purpose of the industrial use of the water is to dilute effluent, it might be a better idea to make the users upgrade their technology so that they don't require the water. We should be looking at closed systems and recycling.

Add your own example ...

We don't seem to have a long range plan re forest and vegetation clearing. What areas are being protected to store water? There's a lot of agricultural land sitting idle yet they are still clearing land. Government should put a stop to it until all agricultural land currently cleared is being used.

Clear cutting in the swan hills region has affected river flows and water quality. We need a monitoring process. When we requested justification of how forestry operations are conducted, they provided a document where a consultant verified that their operations had no effect on the river flows and quality. We know there was an effect. How do we get proper monitoring from the department who provides the permits for these activities? Other affected parties should also be able to monitor effects.

For forest use and industrial use, the biggest problem when developing an area is road and access - oil and gas industry are the biggest players. Even though forestry tries to plan, another industry can often come in and build access roads, etc.

question 11: water conservation options

c. Educate Albertans about water conservation values and methods

Our best insurance is our future generation. What conservation is being taught to them in schools? Are the things we're talking about being instilled in them. Important that our kids be given the right to learn about conservation of water.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

Don't think it should be done. AE will screw it up anyway.

In southern Alberta, many water bodies are man made. Q. Are they also considered natural ecosystems? A. (Ralph)Yes. (Tim)They still fall under the Water Act.

c. Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm

Very good idea because if you don't know what the sensitivity is of aquatic environments and you allow something over the limit - it's too late. So you had best know before.

In some cases, the damage is already done. We're talking as though the province is pristine. Almost all rivers and lakes are already contaminated from some form of industry. There should be an option here that discusses cleaning up systems that are already contaminated.

Different consultants will have different points of view. How do you determine who is right?

Part of our problem is that different levels of government with different legislations often don't recognize each other (CEAA requires assessment but that information is not always used when provincial decisions are made). A lot of federal regulations are not recognized.

Why do we push it to the limit - shouldn't we be looking at zero tolerance? What's going on now should be reversed.

We've talked about costs but these technologies are already in high demand around the world. The initial cost may be high but advancements on that technology can be sold back creating spinoff benefits.

We often sell technologies around the world that are not being implemented here - why is that?

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

Q. How do you bring beavers into the equation and how do you license them? A. Have to determine the impact and resolve the issue on a location specific basis.

Integrated plans have been attempted in a number of areas in this region. It's difficult to get stakeholder buy-in because of the cross over of many interests. However, it's good to do.

Getting everybody to agree on anything is next to impossible. Everyone wants their chunk of the pie and are not willing to give up their share. We should try to find a way to do this but don't hold your breath.

We should also develop wastewater management plans for water basins.

Why make plans if they are not implemented? These plans cost money and shouldn't be put on a shelf. There's no sense in getting people's hopes up and then doing nothing about it.

Are we prepared for when this is a desert (after forestry is done)?

Even if you get the majority of a group agreeing on a position, there's never been anyone to enforce it. Why build more plans when we're not prepared to enforce the plans that are already in place?

additional comments: about water issues

It's amazing to me that you don't have a representative from the federal government at these meetings? They have a role to play as a regulatory authority and they are a crucial part of the puzzle.

Q. Why is government going after the cattle industry to cut down on pollution in rivers and lakes? Municipalities are pulling the plugs on sewage lagoons and it's going into the same system. A. (Participant) Municipal water is tested before it goes back into the water system - it's just about drinkable at that stage.

These same problems and situations have come up before in the U.S. and in Europe. Why reinvent the wheel? Why aren't we learning from other areas in the world?

We tend to get lost in all the surveys that are done provincially. I just want to make my position clear: we [Driftpile] don't want our water sold.

I understand the federal government has enforced some regulations. Their authority supersedes anything provincial. If anything were to occur regarding inter-basin transfers or dams, wouldn't the federal government have to approve it? A. (Tim) Federal government does have jurisdiction where it affects habitat for fisheries.

I would like the DFO to provide a clear definition of navigable water. In the spring, these waters are navigable but won't be later in the year. Would hate to see them enforcing here without a lot of consideration going into it.

additional comments: about water strategy process

Only became aware of workshop a couple of days ago (from a friend). For an important process, there wasn't much time allowed for public awareness and response. It leads me to believe there is already a plan in place. People are suspicious of the government's motives by the way they bring these processes to the table.

Fear this process may not be sincere. No legislation to enforce this. Decisions are still made irregardless.

Calgary: April 9

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

One of the three we considered most important: quantity (the available resource).

First three assumptions: already there - since five years ago.

There aren't known reservoirs for quality water in smaller communities, using surface water.

Scarcity more prevalent with increasing population growth.

b. Access to safe drinking water will become a significant issue for Albertans

One of the three we considered most important: quality water for drinking.

Absolutely the most important aspect.

c. Water availability will limit growth in Alberta

What is "growth"? Economic or population?

Is that a bad thing? Perhaps cap populations? We need a strategy for growth (no point capping Calgary if Airdrie continues to grow).

d. Climate change will seriously affect water flows in Alberta

We need a strategy that can deal with the changing times (weather cycles, precipitation levels, are we entering a drought cycle of 10 years? or 250 years?),

As we become a warmer climate, what about the evaporation rate?

Provincial approach for kyoto should plug in availability of water resources. Both oil and water are natural resources. Petroleum will disappear in the future. Water will need to be managed.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Why are we using so much for irrigation?

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

Don't like wording. We need to be responsible to both of those ideas.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Concerned about all the chemicals that go into water.

Quantity has a profound impact on quality because of dilution rates. If you continue to add agricultural run off with less volume, the dilution factor is impacted.

Should read "are already vulnerable."

Also concerned about trans-dermal absorption of chemicals in water. Impacts from showers, etc.

Particularly true around Calgary. Medicine Hat gets dregs of Bow River system.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Some questions appear to lead to predisposed answers. Flooding: tough luck for the person who lives on a flood plain: is this leading to building more dams?

Not necessarily a safety threat. Need to be aware of how and where we are developing to minimize threat of flooding.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

One of three we considered most important: knowledge (as it relates to lack of knowledge). For instance, we have some fears about diverting water from one basin to another - do we have the knowledge to do that?

Provide new technologies to reduce the amount of water used by municipalities and rural areas.

People are already collecting their own rainwater.

Australia is way ahead of us in reusing and recycling water. Other countries are light years ahead of us.

Industry should have closed loop systems. Comes back to education of general public to use less water (water meters).

Pig farming could be used to generate energy. Don't wait until oil and gas runs out to force new technologies. Put aboriginal people to work cleaning up the environment. Technologies are available but we're more concerned with selling oil and gas.

A litre of store bought water x 45 gallons is more expensive than oil.

Concerned about the unrestricted use of water as a recreational playground (riparian areas west of Calgary) resulting in devastation to watershed areas (e.g. Ghost Waiporous). In order to preserve these areas there has to be better management and less jurisdictional confusion about who's responsible and clearer rules that are enforced. The Bighorn area is a big part of Calgary's water supply. On a busy weekend in the Bighorn recreation area there may be 1000 people, without a sewer system. This is urgent - there should be more concern about this.

Second to irrigation is commercial and industrial use. Would like to see a lot more incentives for industry to recover and reuse water. The volume used for deep well injection is huge.

Have to look at how we use water: watering lawns, mid-day watering with evaporation. Education is important too.

Need to be very aware and responsible of how we are using water.

question 3: are there additional challenges?

We should be thinking about exploring and using the natural systems that are in place instead of putting in dams with open reservoirs. Also, explore storing water under the ground if we have the geological resources (reduces evaporation and leakage).

It's a misnomer to assume that now is the starting point. Many of these strategies are already happening (already developing in places where water is scarce). Our current strategy of taking water out of the river as fast as we can has to be changed - we need a "new" strategy.

There should be acknowledgement of the importance of water management from individuals to highest level of government. Water is far more important than oil, gas, forest, minerals, agriculture - all are nothing without water.

Water is going to be the #1 issue in Alberta.

Don't throw out any of these challenges - they are all important.

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Q. Do they pay for the license? A. There is only a fee for processing the license.

Essential part of the water strategy. All users need a license. It allows for security and with the tool of transfer you will become more efficient. It's a grass roots approach that builds in incentives for users to become efficient. When transfers are made, hold back a certain amount for water conservation. If society values environment more than industry they could buy back the water rights to protect the environment.

In the past, sometimes huge amounts were allocated. It was okay at the time- but how does allowing that allocation to be traded allow for any conservation measure or efficiency? A. There is legislation that if water is not being used, the government can amend or cancel a license. Wasting water is not allowed either. When a transfer is processed the government can retain 10% for water conservation.

Q. How do you monitor water use? A. Each person is required to report water used and water returned. Staff also go out and monitor (usually during times of shortage).

Q. If pricing came in, how would it affect FITFIR? Now it could be sold? A. (Bill) The person would have to determine if their use of the water was worth the cost and whether to let some of their license go.

Competition for water rights (being bought up by towns and cities) puts pressure on landowners to get out of agriculture: a possible negative feature - land not being used.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Strongly opposed to allowing re-sellers in the market (water transfer). If the farmer doesn't use the water, it should stay in the river. Currently, if there's extra water, we can ship it to the next guy - use it to the maximum to maximize our profits. You can't stop who they sell to. they could sell to foreign ownership (free trade). How much can they truck out of the country?

Q. How much water is licensed out relative to the water that's in the river. A. (Allan). Depends on river. If water is not being used, it's going to be reallocated. Allocation is based on median flow which changes yearly. Sometimes we're under-allocated, sometimes over-allocated.

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

There's more water in lakes than in rivers. They are a water source or a place where you could store water rater than building dams. Low depressions could also become water storage areas.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Inter-basin water transfer scares me. It's retrogressive thinking - don't muck around with mother nature. Water that flows on isn't wasted - it's part of a hydrological system. The costs of inter-basin transfer systems also has to be considered. Definitely disagree with idea.

Q. Are transfers happening now? A. Legislation does not allow transfers between major basins - only in sub-basins and even then it would be examined very closely. Water is being drawn off the Bow and some flow goes back to Red Deer just because of topography. It all ends up again in the S. Sask River.

Completely opposed to concept of inter-basin transfers We don't know enough to evaluate fully the health effects on the ecosystem from where we draw the water. Also, it does not encourage changing usage patterns.

Q. Are allocations assigned on a yearly basis? Maybe they should be adjusted monthly to account for change in flows. A. Some people do develop their projects to take advantage of run off [high flow] using off-stream storage. In the future, all proponents will likely have to look at off-stream storage.

We should rather be looking at new technologies (i.e. taking water out of the air).

question 11: water conservation options

a. Establish a price for water used by industrial and agricultural operations

If we're prepared to pay the prices we do for petroleum products, lumber products, minerals, agricultural products: why should water be cheap?

Have a concern about treating water as a commodity. We should develop a respectful attitude toward water (all aspects of life) with the community at large.

People will consider it a valuable resource if priced. Will create more awareness of conservation.

Works against conservation - it just becomes an asset. Short term may lead to some conservation but if warming patterns continue and economic and population growth continues - asset becomes more valuable - then how do you avoid economically diverting it and selling it?

Have to weigh conservation costs against cost of dams, etc.

Do what's good for the people and the environment. Fees would just be for government and industry.

e. Set targets for water conservation for various sectors using best management practices

The greatest gains for conservation would occur in the agricultural sector. Improved systems that avoid evaporation and waste.

Some technologies (e.g. drip irrigation) are very expensive. However, farmers have made huge inroads - they are converting. This drought has also proved that you can make do with less water, if you have to.

Province should ban salt water softeners. A hundred billion pounds of salt ends up back in the river. Technology is available to replace salt systems. Other areas in the world are banning salt.

Looking at non-storage options has been neglected . The Highwood Little Bow basin is over-allocated and they are correcting it by growing different crops and doing irrigation retrofits. First time province is taking a positive step. We have existing strategy in legislation that is being ignored (such as protection of fish habitat) but because of FITFIR, priority is often given to license holders. AE has to give priority to compliance with the Fisheries Act.

Add your own example ...

When municipalities conserve water, it's to conserve how much they have to treat (most of the water is returned to the river system).

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

AE did inflow stream quantification data collection. There is some data available about what minimum flow is but we need more. Use the cautionary principle because we don't have all the answers.

It's very good to do the science but then we promptly ignore the science that is done. Southern tributaries did the science and then allocation went ahead anyway. There should be a requirement to follow the science after it's done and provide the money to implement mitigation measures.

b. Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin

We generally think of riparian habitat as confined to our river systems but we're finding out it affects a considerably broader area. A study by University of Victoria indicates that forests along salmon rivers get 50% of their nitrogen over 300 metres away from the river from the salmon that bears drop in the woods. Have to expand riparian habitat to beyond 300 metres from river. This seems like a negative billing option - to determine how much damage is too much and then take a step back from that. Irregardless, we have to do the science. Not just about land use of water but how far riparian habitat affects the land.

Use the precautionary principle. Don't just determine how much we can do before it's too late.

Don't believe there are enough baseline studies although I'm told monitoring is being done constantly. Where is data?

d. Identify sensitive aquatic environments or habitats that require additional protection

Sensitive habitats: wetlands within City of Calgary are not being protected. Storm water runoff into wetlands will affect that wetland. Need a case by case assessment as each area is very different.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

In rural areas, we need to go beyond the IRP concept. That philosophy was current 15 years ago but no longer. Relationships between activities that occur on the land are important and should figure into planning in an integral way. Based on not good science, activities were allowed in predetermined zones.

Needs to be done province-wide: need to consider each watershed and how they affect each other.

Add your own example ...

Not happy with terminology. Why so much emphasis on the term "aquatic"? Water is the base of all ecosystems.

additional comments: about water issues

Rivers are dying, fish are dying, oceans are dying, species are dying - this is a global issue. We're next because we're destroying the environment. Alberta is raping the environment worse than anybody in Canada.

I want to emphasize the importance of rivers and allocation. Social tensions could evolve during shortages.

Flouride is an issue in Calgary. People assume the quality of flouride in the water is similar to that you would receive at a dentist. However, the quality is not good, only 23% actually flouride, contains many other chemicals that end up back in the river. Needs to be revisited - public were sold a bill of goods. Long term effects have not been analyzed. Haven't done studies on what is absorbed through skin. It can double intake- thereby putting everyone in Calgary at unsafe levels.

Concerned about intensive hog farming operations and the amount of waste they produce. How does this affect the water?

Water Act allows government to implement emergency provisions during shortages or floods. Need to define what is an emergency and how do we manage our rivers during those situations. Last two years could have been classified as an emergency - needs more attention. A. Also involves compensation (i.e. paying farmers not to farm).

A sophisticated water treatment system such as the City uses creates a lot of waste water. Are they looking at systems that use less water? Are they improving the quality of the water going back into the river?

Concerned about a study done 10 years ago which indicated the incidence of prostate cancer increased downstream from Banff to Medicine Hat on the Bow River.

Regarding the studies and compliance that has to be taken on by AE staff. AE is consistently cut back in budget. How can they focus on these issues when budget is getting cut back? Sustainable Development also - both should receive more funding.

Red Deer: April 11

question 1: what are the challenges?

a. Water will become an increasingly scarce resource in Alberta

Some of us agreed, some disagreed. Depends on whether you're talking about clean water or just water in general. Due to clearing of trees over the past 20-40 years, some of our water may have moved elsewhere. Not hugely concerned about water generally. However, clean water may become scarce.

Minister has said that within 15 years in southern Alberta there will not be enough water to support agriculture, municipalities and industry. So in southern half of province it appears it is an issue.

b. Access to safe drinking water will become a significant issue for Albertans

No brainer: if demand for human drinking water goes up it will become an issue. May depend on priorities of allocation: industries, agriculture or water for drinking. What kind of regulations do we need to maintain the quality? Do we have a system to prevent pollution and a system to treat it?

Need to monitor and upgrade water treatment. How much potable water is being diverted into the oil and gas industry? What's information and what's mis-information - how do we sort it out?

Have to look at recharging of aquifers where the fresh water comes from - how fast will they recharge?

What watershed are we discussing? Some we know of are already taxed - more at risk than others. Northern Alberta doesn't have as much development.

c. Water availability will limit growth in Alberta

No-brainer. It would be nice if eastern area had more water. We talked about sustaining the communities we have (Acme, Three Hills, Carbon).

Have to properly manage water resources if you're going to have growth. Regarding location of business, have to determine if the water available - above or below ground. Increase storage in some areas if water is available - also have to look at flow from different water basins.

Don't agree that this will necessarily limit growth. Look at California - despite extreme shortages and the related problems, their growth is unparalleled.

Government may want to direct industries that are water sensitive to areas where water is available.

d. Climate change will seriously affect water flows in Alberta

Agree with statement. Conservation and education is the key. Management of the amount of available water and the quality of pre-treated water.

Generally agreed with statement. Talked about how we are affecting climate change. Some feel it is cyclical, but are we affecting it by the way we deforest and the way we use and abuse water? The bottom line thinking seem to be that money is more important than anything: allowing large livestock operations which are destroying some of our water resources. What are we doing to protect our water resources?

Are we burning too many fossil fuels - affecting climate change?

Why not ask a climatologist? Taking a vote on this won't decide it.

The amount of snowfall is what affects our river flow.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

Three major industries (agriculture, oil and forestry) all three seem to take a lot of water. All three are depleting our resource: taking out forests is affecting our water supply; thousands of gallons of water are required to feed one animal; oil companies are using water to bring oil to the surface.

Strongly agree. It's important that appropriate planning and study are completed in this area before more demands are allowed on this water. Our growth has to be sustainable.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

We agree - if government continues with business as usual. It isn't necessary to progress along the same lines we have been to have economic stability. Government policy would help to prevent some of these problems.

Alberta is a booming province with strong economic growth evidenced through oil and gas and intensive livestock industries. The major source of water is in the north and the economic growth is happening in the south. North has poor quality drinking water – south needs it for economic growth and irrigation needs. Take exception to having to choose between the two. Either one is as important as the other. Everyone needs to work toward addressing the solution. A drop of water in glacier form will take 7 years before it actually reaches our taps.

g. Surface water and groundwater will be vulnerable to pollution and contamination

Already are vulnerable from a variety of sources. We need to become better custodians of our water source.

Not sure how to come to terms with problem without causing significant economic stress.

It's questionable whether or not doing things the proper way environmentally will cause economic distress. Need to find solutions that fit.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

Not regarded as a major problem for the Red Deer River. Land use planning to prevent development in flood plains is important. Flooding is a natural phenomenon that happens from time to time with some benefits. Not necessarily bad.

Two parts of statement are not necessarily mutually inclusive. Safety may not be a concern but potential damage and economic costs could be.

i. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

Agree that it is important now and more so in the future. Education or legislation or a combination is required. Focus on other than residential use which is only 5% of use of water. It's folly to grandfather water use until property is sold (may include seeping septic systems). Environment tends to suffer when industry and dollars are involved.

j. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

Agreed that we would have to spend a lot of money to improve our infrastructure - especially if you want to move water from the north to the south.

Wording seems to imply that dams are the only type of infrastructure. There's a lot more to it than that such as community pipelines, water treatment and sewage treatment plants, etc. Agree all of that will take a significant amount of money. We've taken water for granted for quite a while. Need to conserve what we have and make more efficient use of it.

We're giving too much water to other places when we can't sustain our own needs.

I would reword: "ineffective water management will require significant investment in infrastructure..." There are other ways to address the problem. 15 years ago we agreed to plan on a basin by basin system. Government has been slow to do the baseline research to find out how these flows work. This seems to be pushing the panic button: we're considering things that I thought were ruled out years ago. Let's do our homework first.

Encourage the government to support new technology and invest in new ways of recycling and treating water that will be more economically viable than what we have currently. Invest in research and development.

Does southern Alberta want to bring water in from other parts of Alberta? The provincial government has agreed to fund, but not the federal government.

The Dickson Dam has flooded out a great deal of no. 1 soil. If you keep building dams where there is good soil, we won't have enough land for agriculture to meet the needs of growing populations.

Infrastructure doesn't have to be big. We should investigate riparian zones, subsurface irrigation and other types of infrastructure that will help us naturally preserve the water.

Q. Are the PFRA involved in moving water from one area to another? A. (Participant with PFRA) There is a proposal under the Infrastructure Canada-Alberta Program, a joint government program. It's a large project in southern Alberta to deliver water from west to east. It's supported by the provincial and federal governments and the producers in that part of the province. More information available from Alberta Infrastructure.

question 3: are there additional challenges?

Our watersheds flow into Saskatchewan and the NWT. I feel it's equally important that we develop a national strategy and that it's development with the other provinces and stakeholders.

We have to consider recreational use of water in a water strategy. Sustaining natural beauty and wildlife habitat. Sustaining fisheries.

Should our water be an economic commodity for sale to the U.S.?

question 10: reliable, quality water supplies for a sustainable economy ... how could the provincial government respond if river basins become fully allocated?

a. Determine groundwater availability throughout the province.

Moderately to strongly agree. The way in which it would be done would have to be looked at. All the seismic that oilfields have done – could they share that information? Otherwise would be very costly. A lot of information is available – we need to share those resources and information.

Agreed moderately that government should put some effort in. Focus should not necessarily be on available groundwater but on sustaining groundwater. Companies that want to use the resource should assist in compiling data and ensure there are no negative effects of their use.

Alberta Geological Survey is a good organization that could conduct this work.

There's a lot of information available but no resources to put it together. Let's look at the data we do have.

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

Strongly disagree. May have been a good practice at the turn of the century but no longer warrants being continued. Water needs to be allocated to all in a fair way and should not be available for trading if no longer required.

This is no longer appropriate for Albertans, particularly because it doesn't allocate water to the highest and best use which should be the guiding principle. Discontinuing FITFIR will cause a tremendous amount of disruption and won't be an easy process but it's the only sustainable process. Should there be any doubt, the water has to remain in the ownership of the Crown.

Can't be completely throw away FITFIR: it's the whole basis of the old Water Resources Act and was taken forward into new Act. Registration for agricultural use also works on the same principle. There are more angles to this than first meet the eye at first glance.

c. Allocate water based on its most beneficial, or valued, uses

Generally agree but concerned about how you decide what is most beneficial and who makes those decisions?

d. Allocate water to further uses even if this potentially harms aquatic environments

Strongly disagreed. What is the "further use" and what is the potential harm? Any water taken out potentially harms the ecosystem.

The health of fish is an indication of the health of the river. If they are affected adversely if will eventually affect us all.

e. Set aside water for future population growth before there are any shortages

Conservation is possible but we don't overuse much.

Have to set aside but the challenge is in determining how much? How do you determine the limits of use in a particular area. We discussed pricing controls to help limit use. We also talked about climate considerations that might affect the supply.

Uncomfortable with idea of a community having water reserved for them. I would rather it was available based on demonstrated conservation measures rather than a carte blanche availability.

Set a minimum allotment for domestic use. That's a priority right now and could be moved into the municipal area, province-wide.

What type of population growth is expected? How do you tie up water without knowing? However, we should have an idea of what the watershed will support – that will set the limit.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

Agreed. Feel there should be a board established that would include government and stakeholder representatives to manage the redistribution of excess supplies. Very important that province always monitor water in cooperation with municipalities. Allowing transfers better utilizes the water.

Allowing transfers – not against sharing with municipalities. Concerned if license falls into private or corporate hands. Concerned about who will handle transferring and that there might be a price fixed to it.

If there is monetary value attached to a transfer, it's likely to create a situation where NAFTA might kick in and we lose our rights to our own water.

It's quite clear that there is money attached to this transfer process although that is not made clear in this statement. To attach money is a terrible mistake. If someone profits from transfer of water, it ought to be people in general and it ought to be the ecosystem in general. Let's take the money business out of water transfers: make it a process where it gets used in a responsible way, not based on who has the most money.

g. Encourage more efficient use of water through pricing to reduce overall use

Agreed in general. Put pressure on having meters. Essential to charge industries. Efficient use of water can be done through education as well as pricing.

There are other ways of ensuring efficiency besides pricing. The government has a great power to regulate. It has the power to tell industries to clean up water before they let it go or to recycle it within their own industry. It's done in many other places in the world – we can do it here. Not everybody needs potable water for all uses. Treat water in different ways where you don't need drinking water quality.

Municipalities do not sell water. Price reflects the treatment and delivery. Municipal water is essentially borrowed from the system and then put back.

I hesitate to put a price on water to control the use. Didn't work with gas or cigarettes or whiskey. People with less money wouldn't get the water they need.

There are already places paying for water to drink. Some municipalities with water meters start with a flat rate for the infrastructure and then you pay for anything over the flat rate.

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

We defined storage as anything from a rain barrel to a huge lake. Stewardship is important. Many small contributions add up to a large contribution overall. Climate is cyclic in nature. Don't encourage heavy use activities in low water environments. Small reservoirs are better than large dams. However, if large dams are contemplated - siting is critical. Protect ecosystem but see that tradeoffs may be in our future.

Wondered why this is just for "new operations"? This seems like a variation on everybody having a rain barrel concept seems sound enough.

Mother nature has a storage reservoir system in place which we have decimated. Recovery of riparian zones should be part of any planned program - it's critical. Requires further direction from province.

i. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

Key word is "investigate." Generally agreed. Strong concern about pipelines. Communities with a large industry would have an advantage over communities without a large industry because the industry could bring in water. Is it appropriate to allow that advantage?

Concerned about diversions even if they're not going into another basin. Not enough information to know ramifications. Water is already being piped although probably within the same basin. Large companies would be the biggest beneficiaries. Pipelines would be more efficient than an open transfer. There are cost implications if it's being done by other than a large company. In the past, engineers have tried to adapt the landscape to suit mankind and all such projects have failed. Strong opposition to inter-basin transfers.

Possibly for domestic use but not for agricultural or industrial use – that would be quite wrong.

Currently looking at regional domestic water supply system – treated in Red Deer and sent to other communities. Ponoka would like to be on that system but it would technically be an inter-basin transfer. There are obvious advantages to getting water from a better system. Perhaps we should look at case specific studies rather than sweepingly not allowing. Note from AE staff: Inter-basin transfers not allowed unless there's a special provision such as for drinking water (only by a Cabinet decision). Hasn't been done since the new Water Act but has happened in the past.

Sewage could end up in the other basin. Still a concern.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

Unsure. A lot of issues about contaminants flowing from one to another. With an open system there's not a lot of control. There are environmental and legal issues. Open systems don't always work – rivers do what they want – haven't been successful in the past.

Key word is "investigate." Our group put a low priority on investigating. A series of dams could raise the level in northern systems and spill over to southern system but the costs boggle the mind. There are a lot of other things we could do first before investigating this.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods

Some discussion on affordability. Larger companies would have a better advantage to do this. Investigate some type of commercial value for that use.

Who controls this? Big money companies? International companies? Build up big reservoirs for themselves?

In agricultural communities this is standard procedure (e.g., dugouts and stock watering dams) - wouldn't survive without them.

question 12: safeguarding Alberta's healthy ecosystems ... should the Province?

a. Determine how much water the aquatic environment requires to remain healthy

Who will do this? Government has cut staff over the years? Need a skilled staff. Don't see the will of government here. There's only one water well inspector in the entire province.

May cost a lot of money. There are other ways of doing it other than adding staff - you can subcontract. But there has to be the financial resources and will to do it.

What does word "require" mean?

Need to define indicators of "health."

b. Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin

We know little about climate change - can't make decisions as we don't know what we'll be dealing with. We need to concentrate first on water efficiency and then we can work on these other things.

c. Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm

Disconcerting that we are finding out the maximum amount of crap we can put into the environment. An unfortunate approach.

Have to be conscious of preventing these things from getting in the rivers before looking at this.

f. Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use

Have trouble with the wording of this question. It defines action where the other statements do not (determine or investigate). May affect the answers you get.

Have to be aware that ecosystem is a reflection of where we will be as humans later. Have to protect our ecosystem.

additional comments: about water issues

At the Rocky Mountain House meeting, there was a lot more comment about putting fresh water down wells. Very few comments about that here. Don't interpret that as no concern here - it is a concern.

Current Water Act regulations already protect many of these issues. We don't need more study but we do need more enforcement of what we have.

additional comments: about water strategy process

Q. What will you do with this information? Are you opening up the Water Act again? These seem like basic, fundamental changes. A. (Ralph) This strategy will be a level below the Water Act. We don't anticipate changing the legislation but we are also not ruling it out if it's required.

water for life

record of community workshop discussions: by workbook question

Sub-report No. 2
section b

May 2002

This summary of the community workshop discussions is presented in the order of the workbook topics. At the community workshops, time did not allow for discussion of all topics in the workbook at each meeting. Comments have been grouped into two geographic sections: comments from meetings held north of Red Deer, and comments from meetings held in Red Deer and south of that city.

It should be noted that the comments provided were often the result of small group discussions, with a table "reporter" providing a summary of the discussion at the table.

Community workshops were held between March 6 and April 11, 2002, on the dates and at the locations indicated below:

March 6	Stettler
March 7	Hanna
March 11	Lethbridge
March 12	Calgary
March 14	Westlock
March 18	Medicine Hat
March 20	Edmonton
March 21	Rocky Mountain House
March 25	St. Paul
March 26	Fort McMurray
April 2	Grande Prairie
April 3	Peace River
April 4	High Prairie
April 9	Calgary
April 11	Red Deer

part a: what are the challenges?

questions 1 and 3: possible future challenges

Participants were asked to discuss whether they agreed or disagreed or were unsure whether the challenges listed are future challenges that the provincial government will need to address in a water strategy.

a. Water will become an increasingly scarce resource in Alberta

north of Red Deer

Edmonton Yes - will become scarcer. Wetlands and prairie sloughs in Canada have decreased in the past 70 years - not a good thing. Impacts both humans and wildlife.

Agree it will become increasingly scarce. Flow in Bow was 65% of normal last year. This scarcity might be localized - some smaller water basins may be more affected than others and not necessarily in the drier areas of the province (where they are more used to having less water).

It is becoming scarce (now). There have been demonstrated decreases in river flow of 30-40% between 1920 and 1999 - a long-term decrease covering major river systems all over the province.

Westlock Agree (one of our top three).

Rocky Mountain House Feel this is a cyclical change. This statement makes it sound as though we're running out. Don't agree. But we do need a strategy for economic development that takes into account the available water supply.

Firmly believe that in some areas the quantity/quality is not what it was 20 years ago. Don't know what is affecting it but there is a scarcity.

St. Paul Global warming may be an issue: glaciers receding.

Strictly because of population growth it will become scarcer.

The area SE of Edmonton right down to the border is very short of water right now.

Strongly Agree. Infinite resource but population will be growing. Will have to divide and allocate between larger users.

Fort McMurray All agreed. Gas plants and oil plants booming in this area will affect our resource.

Some parts of Alberta may be worse than others. Q. Is this the reason we're here today? A. (Ralph) No. Minister wants a provincial water strategy. Water management plans don't have provincial scope. Also, strategy is province-wide in terms of departments involved.

It's a global issue, not just a provincial issue. Statement needs broader scope.

As First Nations, we have to deal with the federal government. Recommend that you meet with First Nations communities as part of this process.

It's a problem internationally - global warming. The word "resource" puzzles me. Implies we are recognizing water as a money-making business. Because of impacts in the NE region of the province, we need more work on maintaining clean water for future generations. Any adverse effects will harm all wildlife, fish, our environment - water is the most important element in our lives.

Peace River We're seeing some indications of problems that may become scarcities but not close yet. There's a lot we can do (no flat rates for water, incentives for using water wisely, no inefficient irrigation systems) to use water more efficiently before it actually becomes scarce.

Can't answer: climate changes are cyclical. Today, may be drought - tomorrow could be flood. How does answering this help the Minister make a decision?

Not in all parts of Alberta - probably in the south. One solution for all areas won't work.

Red Deer and south

Calgary Glaciers are receding - concerned if they dry up - what will river systems do?

Generally agree there is increasing demand. Unsure of nature of data collected so far. Expensive to get more but we need more. Critical issue in southern Alberta for agriculture and municipalities. It's an abuse of the system to not come up with a strategy - we will pay down the line. It's time to develop a strategy.

Calgary 2 There aren't known reservoirs for quality water in smaller communities, using surface water.

Scarcity more prevalent with increasing population growth.

One of the three we considered most important: quantity (the available resource).

First three assumptions: already there - since five years ago.

Stettler Agree totally. Water is not something you can come up with wherever you happen to be. Don't put any potable water down injection wells. In other parts of the world many do not have potable water. Water is our most prized possession. We have to manage it well. If we don't, we'll take the full blame in the future.

Water will be a scarce resource, due to population and livestock densities. Also due to oil field fresh water injection.

Water is like land - value depends on location. Demand creates value. There are going to be more people living in this province. We've got to look at location. The Mackenzie isn't going to do us much good in the south. 10% of the water used in Alberta is being injected - that water is gone forever - I doubt it ever comes back into circulation. Criminal to allow fresh water injection.

Will be a long time from now. Go north - you can't go south: Peace River, Mackenzie. We'll never be short of water but we may mismanage it. A feed operator will pump out of his own aquifer on his own property. Don't think we'll be short. Mismanagement starts in the City. Feed operators won't make much difference.

Hanna A number of considerations: Is there going to be less water vs. water use? There is some evidence that there is less water. Is this a blip on the map or are we going into a longer cycle? There is increasing population creating increased demand with maybe less water to go around but how much of that is recycled? - most is put back into the system but it may not be available at the right time or place. Increasing demand from industry will likely create some shortages, particularly in years of drought. Agree that water will be increasingly scarce due to increasing demand.

Lethbridge We have a problem in southern Alberta but northern Alberta does not.

Water needs to be diverted from up north to the south.

In this semi-arid area, water is very tight for agricultural use (crops). However, other areas have different shortages/problems.

Definitely a problem in southern Alberta right now. We could see it becoming a concern if there is overpopulation, we could see possibly limiting industry. This is a semi arid area where water is a limited resource. Priorities have to be put on the use of water. Allocation of water resources should not be left up to government. Individuals should decide on use.

Although northern Alberta does not have a problem with volume of water, they do have a problem with quality consumption water.

Both industry and farmers need to become educated regarding efficient use of water. Efficient use would create the potential for more growth within our basins.

Medicine Hat No consensus at this table - unsure. It's relative to where development occurs within the province since 80% of water is in the north and only 20% of use is in north. If growth would concentrate in the north - probably wouldn't be as important. Water supply is decreasing - don't know whether it is increased use or related to the weather (lack of moisture over past few years).

Red Deer Some of us agreed, some disagreed. Depends on whether you're talking about clean water or just water in general. Due to clearing of trees over the past 20-40 years, some of our water may have moved elsewhere. Not hugely concerned about water generally. However, clean water may become scarce.

Minister has said that within 15 years in southern Alberta there will not be enough water to support agriculture, municipalities and industry. So in southern half of province it appears it is an issue.

b. Access to safe drinking water will become a significant issue for Albertans

north of Red Deer

Edmonton There may not be the resources for smaller municipalities to have the technical expertise they need (especially with this last budget).

In cities there are treatment plants. The majority of people who live outside municipalities don't get their water from treatment plants. They use groundwater which may or may not be close to problematic water (feedlots, oil wells, etc.).

In Villeneuve 30 years ago, they had flooding - now residents pay to have water piped in from Edmonton. We feel it's because of the heavy water use of gravel companies (contaminating the water). Some of the lake levels are going down at a pretty rapid rate. There should be some governing of how water is used - it's affecting the groundwater (aquifers).

Westlock Up to government to assist us in having safe drinking water.

Depends on where you live.

Rocky Mountain House We do need a strategy: most rivers in Alberta are a disgrace - the water quality it poor due to poor water management - used as sewers. We must better enforce regulations in order to work with what we've got

St. Paul Should change water management from Environment to a Water Ministry. We need to tie in the ecosystem to all water issues.

I fear there is a trend that in the future the province wants to change the priority system. Those priorities have to stay. Ecosystem, then domestic use, then agricultural and industrial use. Rob: Domestic use is highest priority. Licenses for all others are by priority in time, not by use. Ecological requirements are written into management plans and allowed for but not necessarily protected by the Water Act.

This is the issue that will drive this whole strategy.

Study of arsenic in water. Government has done nothing. Need to do a larger study and provide assistance. Water is priceless.

No one should be able to contaminate the water sources of others. We have to have meaningful and practical enforcement of regulations. Permitting after the fact should not be condoned (justifying bad action).

Is a significant issue now.

Grande Prairie Already an issue, although less here than in other parts of province. However, potential to be a problem is still here. Low water tables create need for alternate sewage disposal system. Monitor industry and agriculture re groundwater contamination (animal waste and chemical). Industry seems to be acting but not sure how effective they are. How does average citizen find out?

AE doesn't have enough staff to monitor the environment. The industry monitoring itself is disastrous. Needs to be rethought.

Peace River Statement infers that safe drinking water is not an issue now - but it is. Walkerton has affected the way we think about treated water.

More of an issue in small urban areas as they can't afford the technology to treat water properly. There will be more of large centres like Edmonton piping water to smaller centres.

Chlorine in water: is a poison. Especially for women (breast cancer). A real concern to me. Would rather have safe untreated well water than treated water.

A lot of regulatory policies now in place concerning health issues and the safety of water. More concerned about the assessment of the big picture so we can then plan for future use - which we don't have now.

Very concerned. Many farmers use pesticides and herbicides that poison water. Gas and oil industry also affects water.

Potable water vs. drinking water. Clarify the definition. Potable water means drinking water but, according to municipalities, means treated water. Should be able to get (haul) good drinking water, as well as treated water.

High Prairie Goes with 1g [vulnerable to pollution and contamination]. If you don't have clean drinking water, you have nothing. Education (1i) is the way you keep it forever.

Goes hand in hand with 1g. More industry in the area is a concern for water quality.

Red Deer and south

Calgary Agree that water supply is safe in Calgary. Not necessarily everywhere - need to be careful.

Define "safe drinking water." We currently have a sizeable amount. Place emphasis on control and maintenance. Cities have secure drinking water. Safe drinking water is being used to water lawns. Rural areas don't have access - to get access costs a lot of money. No government support for testing (assuring proper equipment).

Need a definition of "safe drinking water." How does government define it? Definitions vary depending on location. How do you help people achieve new standards as they change? Can rural areas afford the type of water treatment required? Where's the empirical evidence that this will become a significant issue? Everyone currently has access to safe drinking water (at this table). We have the technology and means to deal with water quality. In the future, it shouldn't be a problem if we deal with it today but it costs dollars. Issue of accessibility - difficult to generalize across Alberta where there are many variations and differences. Is there a black cloud? Should we be worried?

Calgary 2 One of the three we considered most important: quality water for drinking.

Absolutely the most important aspect.

Hanna Minister could declare a state of emergency if required. He could direct the water to anyone he chose at that time. There are no guidelines for compensation.

Drinking water is a priority for use. Because it affects everyone, any fixes required to be made by the provincial government would have wide support.

Agree - especially on farms.

Q. Has there ever been a situation where municipalities were shut off and people had no water? A. No.

Lethbridge Can we compare ourselves to Walkerton? It was obviously mismanaged.

Farmers take water from dugouts - we're responsible for our own water. In cities, no one takes responsibility. Individuals could get their own water checked if they are worried.

Safe drinking water is already a problem. It's often taken for granted that it's safe for consumption. More and more people are buying bottled water rather than drinking tap water. Our groundwater is already contaminated (pesticides, etc.). Industry has an effect on our water. Effluents released into rivers also contaminate water. How safe is our drinking water? No situation in Alberta yet such as Walkerton, but concern has been raised.

Public has to be educated with respect to risk assessment. Decision makers and infrastructure workers and the public all have to be well informed.

Citing Walkerton is fear-mongering - Environment has fairly good controls over drinking water. If everybody does their job well - we won't have a problem.

Well water + human error caused the problem in Walkerton. Good treatment and competent people will overcome that.

Medicine Hat Bigger issue to be concerned about than just drinking water - there are herbicides in rain water and various other organisms and animals that drink water. If they're ingesting carcinogens and passing them along in the food chain - we have to be concerned about that as well. Estrogen levels in south end of Mississippi River are starting to cause huge problems with human population.

Agree. In our area with heavy livestock industry and farming industry (chemicals), we've already noticed an increase in water being tested for chemicals. In southern Alberta (shallow wells), aquifers are already contaminated. We know this already and are already concerned.

Your skin absorbs chemicals from water also - "safe" goes beyond what you drink.

Yes. Whether the problem is real or not, there is a perception that it is true so will have to be addressed. Large petro chemical industry punches into aquifers - little knowledge about how substantial our aquifers are and how they are affected by such activities. As urban centres increase in size, there will be issues of water supply and a percentage increase to dilute effluents that are returned to the river basin.

Wording should be "potable" water. Understood that it means water that is safe for human consumption.

Drinking water: comes in a bottle from town or store. Huge majority of water is flushed. The level of quality needed for that is significantly different than for drinking water. For the water we actually drink it's probably not going to be a problem. Water quality for other uses (bathing, flushing, lawn irrigation) is a different priority. Affordability should be a part of it - access is easy - based on cost. A lot of people don't drink tap water anymore.

Red Deer Need to monitor and upgrade water treatment. How much potable water is being diverted into the oil and gas industry? What's information and what's mis-information - how do we sort it out?

What watershed are we discussing? Some we know of are already taxed - more at risk than others. Northern Alberta doesn't have as much development.

Have to look at recharging of aquifers where the fresh water comes from - how fast will they recharge?

No brainer: if demand for human drinking water goes up it will become an issue. May depend on priorities of allocation: industries, agriculture or water for drinking. What kind of regulations do we need to maintain the quality? Do we have a system to prevent pollution and a system to treat it?

c. Water availability will limit growth in Alberta

north of Red Deer

Edmonton Economic growth may be affected in some parts - especially southern Alberta. Water could be used more efficiently - also especially in southern Alberta. Is water wasted in irrigation operations? Industries that use a lot of water, and are not dependent on weather, could go where the water is more plentiful (north). Is population growth a good thing? Rather, perhaps we could have economic growth based on working smarter. Locate population where the water is.

Agriculture, irrigation, intense livestock operations may not be able to go into communities with limited water. Oil companies should only be allowed to take limited water out of rivers, lakes - may not be viable at all in some areas.

Westlock Occurs already in areas of this district. Some producers are up to their growth limit with not enough water to expand.

We should ensure that we know capacity and use it in a diligent manner so we won't have a problem - although we still "may" in some areas.

"Will" - there is no assurance that it will happen.

Rocky Mountain House Water allocations have severely restricted growth in the south.

St. Paul Two part question: urban growth won't be affected as cites have enough clout to get the water. For industrial growth: development may not take place if not enough water is available.

We often think about moving water to where people are. Perhaps we need to think about moving people to where water is located. Will limit growth if we keep on our current trend.

Grande Prairie We have 80% of the water, but 80% of the people are in the south. Big issue is how water is used by the big users.

Water is not over-allocated in Sexsmith. Industry taps into potable water from the reservoir and use it for well injection. It's easy for industry to pay the insignificant fines.

Industry and agriculture have already been limited. Agriculture in south would like to irrigate more land than they already do. In Sexsmith, water is already over-allocated. Have to decide whether or not growth is always appropriate.

Where there is societal benefit, we should provide some returns for those who maintain water on their land (i.e., maintaining wetlands). Recognize the inherent value of water and factor this into the economic equation (so it is not purely profit-driven).

Old Man River dam serves 107 farms: quite an investment for a small number of people. These decisions are not driven just by economics - they are also driven by political will.

Economics affects water use. Sexsmith allows industry to use the water because they need the tax dollar generated by industry.

Red Deer and south

Calgary 2 Is that a bad thing? Perhaps cap populations? We need a strategy for growth (no point capping Calgary if Airdrie continues to grow).

What is "growth"? Economic or population?

Stettler In our area (east) we (farmers) are losing ground. We are really limited and water is a major factor. This is a current issue - not the future.

Agriculture and industry are at a point where they cannot expand due to a lack of groundwater. It's very difficult to get an allotment from the Red Deer River.

Doesn't the population growth influence decisions on these questions? More population increases demand for water. It takes water away from other uses.

Have to look at the most effective use of water in a particular area. The drier southern part of the province - where water is not used as efficiently as possible in some irrigations projects. Water could be transferred to other areas of province.

Hanna Yes and no. It will be a factor in where growth will take place. Heavy water use needs to be near water. Industry may choose to go north where there is more water. Availability will steer growth and affect growth with respect to location.

Lethbridge In the long term, yes. But for the short term, we still have room to develop if we use water more efficiently. Limitations may be based on where industry may locate.

Medicine Hat Agree. Initially thought only in the south. But in the north water, will limit growth also. Biggest users are agriculture and industry. Even in the north, the industry may not be where the water is. The availability of water has already limited growth in the south.

Last year almost lost an industry due to lack of water.

Red Deer No-brainer. It would be nice if eastern area had more water. We talked about sustaining the communities we have (Acme, Three Hills, Carbon).

Government may want to direct industries that are water sensitive to areas where water is available.

Don't agree that this will necessarily limit growth. Look at California - despite extreme shortages and the related problems, their growth is unparalleled.

Have to properly manage water resources if you're going to have growth. Regarding location of business, have to determine if the water available - above or below ground. Increase storage in some areas if water is available - also have to look at flow from different water basins.

d. Climate change will seriously affect water flows in Alberta

north of Red Deer

Edmonton Have to plan for the worse case scenario. All levels of government should communicate and work together. Glaciers are melting - can we somehow store that water? To reduce the use of water, tax people who use it inefficiently.

Westlock Climate change is a cycle.

Don't believe it will "seriously" affect. Warming up means more melt in the mountains, more flow.

Define "climate change."

St. Paul Climate change is already affecting water flows. Drought conditions in northern Alberta have resulted in creeks, streams and sloughs drying up. Water tables are dropping - wells are in danger. Fewer rains = poorer crops = economic costs. More forest and grass fires - more loss. Wildlife is moving with the water. As more land is cleared there is less water and faster run off. There has to be a tremendous change in water flow in this region, not just southern Alberta.

For this region, climate change model predicted the annual temperature will rise between 7 and 9 degrees Celsius - leading to evaporation and soil moisture loss of 30-40%.

Fort McMurray "Will" should be "is."

Government allowing cutting down of trees (ALPAC) causes the problem.

If water flows are reduced in southern Alberta because of climate change, will they be clamouring for our water to be diverted there?

Grande Prairie Unsure about the wording "will seriously affect" - there may be some effects but not sure they will be serious.

The climate is always changing: the difficulty is understanding what the effects will be. We are dealing with a lack of basic science right now.

Peace River Yes, am concerned.

Climate change is a natural thing that happens - not necessarily "serious."

It may go beyond what the government can control if it gets severe (i.e. no snowfall means no river flow) - doesn't matter how many dams you build.

Educate people to help address and manage for climate change: water conservation techniques, research into ways the oil industry could use water more effectively and technologies to manage the water we do have during times of shortage.

Kyoto agreement: Premier against it because it curtails industry - an ignorant comment. Be more creative: there are industries that could be accommodated within Kyoto.

Red Deer and south

Calgary Won't debate climate change. Government needs to address the changing water levels year to year, generation to generation. Need a comprehensive management plan. Government needs to look at now. May not be as high a priority as some of the other challenges. If the system is finite, it becomes more important to define a very definitive system with stringent guidelines for the long term.

Agree generally.

Calgary 2 Provincial approach for Kyoto should plug in availability of water resources. Both oil and water are natural resources. Petroleum will disappear in the future. Water will need to be managed.

We need a strategy that can deal with the changing times (weather cycles, precipitation levels, are we entering a drought cycle of 10 years? or 250 years?).

As we become a warmer climate, what about the evaporation rate?

Stettler We agree. Climate change works in a cycle. We've had both droughts and wet periods in the past. "Seriously" is a pretty strong statement. It will have an affect but we're not sure how seriously. Contingency plans need to be in place - designing a system is an option but an expensive option. Properly managed water plans.

Surface water flows: Province can react to and plan for but re focussing resources can't do much to control. Plan, prepare but not a resource allocation issue.

Hanna There's still enough uncertainty about global warming to make it difficult to say whether it's an issue or not

Lethbridge Biased question - who wrote the question?

Climate change models indicate precipitation will be reduced in the future.

Our opinions may be irrelevant. Kyoto proposal - we may have to comply whether we like it or not.

Not sure whether climate change is actually an issue. If it is true, it will definitely affect water flows.

We should use the precautionary principle. Even if you're not sure whether climate change is real, it doesn't mean you shouldn't act on the possibility. By planning for the possibility, even if there is no climate change, we would be further ahead.

Medicine Hat Definite maybe. "Can" is a given. Not known if it "will" in the future. There are cycles in weather - what do we call climate change? Is it a permanent change from ice age onward, or a shorter term aberration.

Red Deer Generally agreed with statement. Talked about how we are affecting climate change. Some feel it is cyclical, but are we affecting it by the way we deforest and the way we use and abuse water? The bottom line thinking seem to be that money is more important than anything: allowing large livestock operations which are destroying some of our water resources. What are we doing to protect our water resources?

Agree with statement. Conservation and education is the key. Management of the amount of available water and the quality of pre-treated water.

The amount of snowfall is what affects our river flow.

Are we burning too many fossil fuels - affecting climate change?

Why not ask a climatologist? Taking a vote on this won't decide it.

e. Industrial and agricultural growth will create greater demands for water - not always in places where water is plentiful

north of Red Deer

Edmonton Water is a cycle - available all the time - except where the oil industry is pumping it down into wells. A phenomenal amount of water is used. Should be addressed by government.

Sturgeon County just approved a large hog operation north of Edmonton. Can our water system handle it? These operations can have 30,000 hogs. The County wants the tax base but it may pollute our water system.

If economic cost was translated into a price - the natural forces of the market would create better use of the water. For instance, the most efficient methods of livestock production would be used.

Industrial and agricultural growth will increase demand. New technologies are not incorporated in Alberta very quickly. There are solutions (Europe). As the demand increases, you have to be careful how water is managed in order to not limit growth.

Surface water is being considered. But in our area it's aquifers. A hog operation is on an aquifer that feeds Lac St. Anne which flows into the Saskatchewan River. Once polluted, it's polluted for a long time.

Urban planning issues: human effluent goes directly into river during high storm runoff. Citizens are not fully aware of potential harm from pathogens that go into river.

Part of the problem with the use of potable water is poor planning (urban sprawl). Increase the density in downtown cores, make better use of the space you have. Don't chop up waters, change water courses. We do more damage with people than hogs.

Greater demands may be off-set by better technology and more efficient use. Pretty expensive to move industry up north.

Westlock It's very true.

Politicians make it happen that way.

Rocky Mountain House

Industrial and agricultural growth, combined with climate change, as well as the nonrenewable use of water, will *together* create significant demands for water.

We sometimes continue to develop where water is scarce.

Industrial and agricultural are two different types of use - one recycles water and one throws it away.

St. Paul

Allocation for water use in this basin for industry is extremely high. Agriculture made Canada. Oil and gas is important too but when those resources are gone, they are gone. We will still have to support agriculture. Potable water should not be used for oil injection.

Preserve surface water by planting trees, stopping clear cutting. Wind and evaporation factors: many sites were not replanted. Plant windbreaks. Take action to avoid evaporation and losing the moisture from snow cover.

Industry is given tax breaks or incentives. Give them incentives to use alternative methods so there is more use for agriculture.

Industry has already made a significant effect on water in the Cold Lake area. Industry will have to truck it in where it is not available rather than use groundwater. How far do lake levels have to drop? What constitutes a drought situation before government takes action? Watershed systems should not be diverted to another area.

Agriculture is dependent on rainfall - few farms in this area do irrigation (usually food sources). Food and people come second after industry. Are we going to have to pay for water? At what price? Some of us have already applied for water licenses. Will that control our growth? If we sublet, will those lessees get a portion of our share of water? Subdivided land creates more water users - will create a huge problem. We should be looking at reforestation to protect water systems. Don't allow land to be completely cleared. Birds and animals need more than flat land to survive. We also need to protect our underground water supplies.

Grande Prairie

This area has a significant problem with water that is already impacting industrial and agricultural growth. Seasonal changes from year to year in water flows.

This assumption is clearly related to the Minister's comments about diverting water from the north to the south where growth is occurring.

Peace River

Part of the problem is that the highest use is in the areas where there are shortages.

Government should keep in mind where water is available when approving industries, rather than moving the water to the industry. Also, better control how water is used - to avoid pollution.

An important issue in terms of overall water use in next 20 years. Industrial/agricultural growth in combination with population growth may become a critical factor in some areas. Conservation will become very important in places like Lethbridge, Medicine Hat. We have to try and steer some of the growth that requires water into areas where there is plentiful water.

Also have to recognize that some things aren't transferable: can't grow sugar beets in Peace River. However, some crops do well here or can be adapted without irrigation required: canola, alfalfa.

High Prairie Concerned that decisions have already been made. Where does province draw the line between sustaining economic growth in the south and protecting the environment in the north. Will our voice be heard? We worry about being railroaded by the majority and being left with a dirty back yard to clean up just so southern Alberta farming can continue.

Red Deer and south

Calgary Supply and demand: there is a limit to the supply especially in the south where strongest economic growth will likely occur. Must pay attention to solving the equation. If you undervalue water, people don't have to manage it intelligently. If managed properly, we could have more economic growth.

Agriculture, industry are also driven by population growth. The type of industry and where it is placed is also important - impacts downstream. The supply will eventually limit the use. We must acknowledge it, plan for it and deal with it.

Feed lot legislation. Impacts of fast food industry. Are we going to allow them to dictate where these industries are placed and what is required?

Underscores the need for levels of communication between agricultural and non-agricultural sectors - especially the level of cooperation in the use of the water. Much of water earmarked for agricultural irrigation - also serves purpose of supplying water to smaller centres throughout the province. This needs to be recognized by both sectors. There could be an eventual clash between sectors unless there is cooperation.

Fish drink water too (re quality of water).

Calgary 2 Why are we using so much for irrigation?

Hanna If the licensing system is working appropriately in Alberta, that could not happen. Diversion of water - don't have a clear understanding of how that works. Comment (AE): Licensing process assesses if enough water is available for the application. Would there be continued demand whether or not there is enough available water? Junior licenses are cut off sometimes if flow is not sufficient. Flow varies every year. That's why priority system works.

Obvious greater demand.

What's the advantage of licensing wells in 2002? A. Surface water is a lot more variable. Ground water levels change very slowly. We monitor water tables.

Lethbridge Albuquerque was able to reduce their residential consumption - industry used up the allocation (Intel).

Yes, but will also create a greater demand for efficiency. If you reduced consumption by 50% you could increase growth.

We should limit industrial and agricultural growth in areas where there is less water.

You have to consider production relative to consumption (input is high, but output is also extremely high).

The crops we grow (cattle, sugar, potatoes) are high demand for water crops.

Need to look at education of city populations. The use of water for the beautification of cities should be part of the equation also.

Medicine Hat Urban growth will concentrate in south as it always has. Major user and polluter of water. Urban growth will become a more significant factor.

Agree. Industrial - unsure - will grow wherever use and process occurs. Agriculture is a process use larger in the south because of the heat needed but we need more water. Specialty agriculture growth may be limited.

Red Deer Strongly agree. It's important that appropriate planning and study are completed in this area before more demands are allowed on this water. Our growth has to be sustainable.

Three major industries (agriculture, oil and forestry) all three seem to take a lot of water. All three are depleting our resource: taking out forests is affecting our water supply; thousands of gallons of water are required to feed one animal; oil companies are using water to bring oil to the surface.

f. Albertans will have to choose between the sustainability of aquatic ecosystems and economic growth

north of Red Deer

Edmonton Have already chosen economic growth over water quality. They will continue to choose that but we don't think they have to choose. We need regulations rather than guidelines, with enforcement. Many exceed guidelines.

Westlock Recognize that in some areas, we may have to put a limit on economic growth in order to maintain sustainability - cannot have economic growth at all costs.

Government regulations don't help us to look at things in this way. There are numerous examples of where economic growth was allowed to continue at the cost of the environment. There hasn't been enough homework done to date and regulations to help us with these challenges. Government must show due diligence around these issues or it's an exercise in futility.

St. Paul Don't believe we have to choose. Two thirds of the water in Alberta drains through the Peace and Slave Rivers. Government should look seriously at retaining some of that water. Hydro electric power dams. Alters surface of ecosystem: Change isn't necessarily bad and enables you to retain the water. Has to be looked at as an overall plan. We have to investigate how we can make both possible.

If you reduce the flow from the Peace River, all ecosystems downstream are disrupted. Choosing economic growth over ecosystem doesn't make sense in the long term even if you have short term gains. Long term consequences may not be reversible. Already seeing such in Peace Athabasca Delta. A dam doesn't make ecosystem sense even if it promotes growth. Shouldn't have to choose between the two. Err on the side of caution: use precautionary principle. Think long-term. Determine effect of development in particular areas. Growth should be determined by the water flow, not the other way around.

I have seen the damage a pier can create on Lake Winnipeg. There is damage in Cold Lake from the marina. We need to look at reforestation and cleaning creeks of garbage and pollution. Has to be looked at quickly.

Does the Water Act allow for direct allocation of water to an ecosystem that would be in direct competition for all other allocations? Who is responsible? A. (Rob) We can allocate to the people of Alberta.

Q. How does protection of the aquatic ecosystem fit into the current Act? If the aquatic ecosystem cannot be protected, development should not proceed. We shouldn't compromise the system and then pay and pay again for treatment. A. (Rob) Water Act can set aside allocation to allow us to protect the aquatic environment.

Ecosystem is important (goes with #2 - access to safe drinking water). Wetlands cleanse waters. Very important.

Finding a balance is extremely important. A 100 years from now people will wish we chose the ecosystem over economic growth. Err on the side of protection.

Policy or social issue: want to move toward a sustainable option where we can have both.

Water equivalency doesn't necessarily mean more fish. Fish don't like changing water levels. Sediment can fill a dam. Future generations would have to move a lot of dirt to get any hydro power from dams.

Environmental harm from industrial use shouldn't be an "either or" situation. Sometimes it's a trade off (i.e. a dam creates an alternate habitat). You can have both but be very careful and establish the proper requirements.

"Choose" - we are now seeing results of bad choices. The ecosystem been around a lot longer than economics. Have to make fundamental shift in our thinking. What do we really want? Economics will likely have to be sacrificed if we want to continue as a species on this planet.

Q. The federal Fisheries Act has a policy no net loss of habitat - how does that tie in? A. (Rob) DFO (Department of Fisheries and Oceans) principle for development: providing equivalent habitat when necessary.

Already too late: we don't know what the baseline is so how can we protect a system we haven't yet measured?

In some parts of the world they have realized they can't grow anymore. If we continue to think we have to grow, we will continue to screw things up.

Don't need to choose. If we don't have a healthy environment, we won't have economic growth. Choose that first, economic growth will follow.

Fort McMurray We probably use more water per capita than Europe does. We should use their technologies for conservation.

Grande Prairie Can't consider this alone without #10 (work hand in hand). However, it won't require major investment: suggest they use small dams 8-10 feet high to slow down water. Reforestation is also required: logging has ruined rivers.

In order to be a sustainable system in the long term, these two elements must work together.

Peace River What does government mean by growth? Diversifying our agriculture and finding other sources of energy also means growth to me.

Not a choice between the two: need a sustainable aquatic ecosystem in order to have economic growth. Goes together.

Red Deer and south

Calgary Sustainability is the key word. Some civilizations disappeared due to salinity. Once we start irrigating, we need to continue to force water into it. Once the flow stops, you kill the soil. What this soil needs is more and more water to prevent salinity killing soil.

Worth looking at diversification in agriculture. Currently takes a lot of fertilizer and water. Intensive systems requiring less water might be a way to balance aquatic systems with economic growth. Change what we're doing.

A priority - but don't need to give up on economic growth - balancing act. Stress need to protect aquatic systems.

Economic development will eventually affect aquatic ecosystems. When running short of water - how do you stop economic development? Need to decide which is more important. There are other considerations such was water conservation and recycling - many methods not utilized yet. Urban sprawl will take agricultural land out of production - water use reverts to municipal development. The choice will be quite a ways down the road but should still think about it.

Calgary 2 Don't like wording. We need to be responsible to both of those ideas.

Stettler We'd like to see both happen. However, when water becomes scarce - the fish and toads are going to die. Livelihood comes first. But we also believe ecosystems are important.

Confrontational wording.

Hanna No. Shouldn't have to choose. Water could be managed better. Why not treat the water used for oil and gas injection so it can be reused. With more efficient use of water and regulating - should be enough water.

Not comfortable with wording. Implies there is already not enough water. Don't feel it's an issue as yet.

Some feel taking any water affects the ecosystem. We have to choose the point we can live with. Diverse opinions on that.

Lethbridge Can go together - irrigation systems and canals can protect ecosystem. Disagree with statement. Don't need to choose between the two.

You will need to make a choice; people are already making choices. If there's a change in the future, you will have to decide in which direction you wish to go.

Need a balance between the two.

We have created several different ecosystems - we can damage those also without proper balance.

Every drop we take out has a negative impact on the aquatic ecosystem. If we do it - we need to determine where the balance is. Ecosystems evolve and function within a range - if we change it, we will change the ecosystem. Balance human needs against environmental damage. Need to put a lot of work into discovering where that balance lies.

Disagree with statement the way it was written - there is a balance we have to reach. All of us use water.

Medicine Hat Disagree. Definition is required. Shouldn't have to choose. Aquatic ecosystem is not a term as well defined as economic growth. Where do we draw a line to compare (from year to year). Choosing will force a fight when it should be sustainable on both sides.

Sustainability of the aquatic ecosystem will control economic growth. If the system can't recycle itself, the economic growth will not happen at all.

We have to let 50% of the river flow go on to Saskatchewan and Manitoba. Not a worry for this area - the aquatic ecosystem.

Red Deer Alberta is a booming province with strong economic growth evidenced through oil and gas and intensive livestock industries. The major source of water is in the north and the economic growth is happening in the south. North has poor quality drinking water – south needs it for economic growth and irrigation needs. Take exception to having to choose between the two. Either one is as important as the other. Everyone needs to work toward addressing the solution. A drop of water in glacier form will take 7 years before it actually reaches our taps.

We agree - if government continues with business as usual. It isn't necessary to progress along the same lines we have been to have economic stability. Government policy would help to prevent some of these problems.

g. Surface water and groundwater will be vulnerable to pollution and contamination

north of Red Deer

Edmonton Huge hog operators are not farmers they are industrialists - manufacturers - who treat animals as merchandise. They don't care about the environment, water, or neighbouring lands.

Each sector of society wants to be the best wise water user. It's the cumulative effect of all of our water uses that is causing problems. It's the fault of activities that are not monitored and regulations not enforced. The budget just released tells us there's no money for it. With respect to manmade contributions to water quality, we can make wise use changes in municipalities, and in the oil and gas and agriculture sectors.

Agreed. Any land use will cause increased pollution as a result of runoff. The impact, whether large or small, can only be defined by the [downstream] users (i.e. there is no common definition of healthy water - depends on what you need/use the water for). Should take a global approach for defining pollution impacts - rather than a specific approach - it's a larger issue than one basin. There are also different opinions on what is a pollutant - difficult to understand. Technologies and research will provide more information: what's safe today, may not be safe tomorrow when we have better information.

Concerned about open shot holes (drilled by oil companies) - pollution running into water systems - people don't realize the danger. Realize what's going on around you. Developments, big holes, land surface cut up - the land structure has changed.

The pulp mill in Hinton was developed in 1956 on not very stringent pollution standards. There's pristine water from Jasper right up to Hinton - east of Hinton it's like a sewer. How many tons of pollutants are laying in the Athabasca delta and how long will it take to clean it up? The Athabasca River ends up in Slave Lake and then in the Arctic Ocean.

Industrial pollution of groundwater - consumers have to be cognitive of the types of products we use. For instance, (MTB)? used in gasoline travels in groundwater systems extensively. There are alternatives.

People who pollute are doing so because consumers want the products they use. Don't complain when you use these products.

Government is responsible for the current regulations to protect our water. No government body, provincial or federal, is monitoring and enforcing those regulations. Won't get any better in the future unless we do something about it.

Concerned about factory farms from foreign countries which pollute both ground and surface water (areas east of Edmonton, part of North Saskatchewan River system). Manure, parasites, and antibiotics used in feeding go into surface water. Cities also contribute to pollution (salt on streets, common garbage that goes into rivers). Farms also contribute with herbicides and fertilizers.

Westlock

Why don't they have a question about what is causing our water to be contaminated (Swan Hills)?

Already is.

St. Paul

One litre of oil will pollute 1 million gallons of drinking water. Just draining your own car on your own property can pollute your own water supply.

Already is vulnerable. Farmers spray more often now. Industrial use also. Edmonton and Calgary also both contribute pollution to the river during heavy rain or spring thaws.

Q. How can we protect our water from boating and vehicles on lakes. How is use prioritized? How much does it take to pollute? A. (Rob) Doesn't take much to contaminate a fairly large water body. Some natural mitigation systems (soil). Oil spills have happened. The environment does recover in time if cleaned up correctly.

Fort McMurray

This is happening now, not a future issue. We should be acting now. Government should help us prevent pollution in our area (Conklin). Don't want to wait until water is unsafe for our children. Eventually industry will pollute the lake (Christina). Need to educate our children - inform them about how to protect their lake.

Grande Prairie

Impose current regulations, rather than make new laws.

Knowledge and education also an important component of this question. Need more knowledge about groundwater in the Peace country. Land uses have an impact on surface and groundwater. Need more research into how these impact together.

Currently happening. Mortgage companies already asking for wells to be tested before granting mortgages.

Strategies have to be driven by non-economic public decisions (although industry should be part of the discussion).

Our creek has been polluted by a couple of feed lots. There's no law in place to protect us. Way behind the times.

High Prairie

Quality of water in our region is a major issue: the relationship between industry and water quality. The change over the years has been drastic. We've had to deal with oil spills and pollution from Swan Hills that have affected our water.

Projects are approved and permits issued in isolation. When approving anything in this region, the cumulative effects of contamination should be considered.

Red Deer and south

Calgary Agree it's important. Everyone pollutes: all industries, farming, people. How do you stop it?

Need to look at concept of sustaining economic growth. Impossible not to result in serious pollution and contamination. Need new models to determine what we need for economic growth. Why are we still polluting to gain economic growth?

Unanimous (at table) that it is important. Local examples of where water is a concern are agricultural industry, industry, and cattle operations. Community programs to protect and manage water. Maintain wetlands.

Calgary 2 Also concerned about trans-dermal absorption of chemicals in water. Impacts from showers, etc.

Particularly true around Calgary. Medicine Hat gets dregs of Bow River system.

Should read "are already vulnerable."

Quantity has a profound impact on quality because of dilution rates. If you continue to add agricultural run off with less volume, the dilution factor is impacted.

Concerned about all the chemicals that go into water.

Stettler Every quarter section in the province has 24" wells drilled by homesteaders in order to get government grants for "improving" the land. They then sold the homestead and left. These wells are a concern as they can get polluted and can also be a hazard to human safety.

Water injection wells - mostly in the northern part of the province - but are province-wide and could cause contamination.

Already is a problem and has been for some time. Oil companies drilling through various layers of groundwater allows contaminants to permeate through the soil and good and bad water can mix.

Extensive use of nitrogen and phosphate fertilizers that are not properly infiltrated or improperly used are a concern.

Airborne contaminants may also be important.

Hanna Already is vulnerable to both. We don't make the link between contamination and how water and land is managed. Intuitively we understand the connection but not with decision making.

Lethbridge Agree, but say "is now and will always be vulnerable." As we grow and develop there will be more pressure from contamination and pollution. People are more knowledgeable now than 40-50 years ago but constant education is important.

Already are vulnerable to pollution.

Medicine Hat Initially in agreement - a challenge in the future and for today. Although things may become increasingly better, there are still great challenges ahead (contamination from industry).

Unsure. Vulnerable now. When we adjusted the question to the future, some felt that as there is more development, the water will be more vulnerable. On the other side, we're also doing much more to mitigate that risk, even now. In Europe, rivers have been cleaned up substantially in recent years. As we identify what is polluting our ground and surface water - we are doing something about it.

Red Deer Not sure how to come to terms with problem without causing significant economic stress.

Already are vulnerable from a variety of sources. We need to become better custodians of our water source.

It's questionable whether or not doing things the proper way environmentally will cause economic distress. Need to find solutions that fit.

h. Flooding will pose a threat to human safety and create potential damage and economic costs

north of Red Deer

Westlock The way it's stated - it's a given. Control is a different issue. Control is the challenge.

It's your own fault if you build or develop in a flood plain (self-inflicted problem).

Watersheds, headwaters are gone - impacting downstream.

Stop draining wetlands then water wouldn't come as quickly.

Spring flooding can become a plus if it only happens every 20 years or so.

St. Paul Flood plains are attractive not only to agriculture but also to residential development. Loss is often due to loss of property but it's the gamble you take when you develop in a flood plain. In the U.S., many communities are literally being moved.

Agree. Already has. Substantial amount of change in landscape and watersheds in it. Has changed flow of water - speeded up run off rates creating extra pressure on infrastructure and ecosystems alike. Need to look at replacing vegetation, etc.

Flooding can be ecologically very healthy. Cottonwoods are in peril because dams have blocked flooding. Result is rapid deterioration of major riparian systems. Flood plains are very good for agricultural growth zones. Flooding brings in new minerals and other soil supplements. So, although it can be costly, it can also be ecologically healthy.

Major floods in Alberta were caused by human error: deforestation. Look at the root of the problem.

Fort McMurray Bennett Dam: if it ever let go, the whole Peace River territory will be under water. There's 200 kms of backwater - a hazard for humans.

May never have a flood again in this region. Flooding would only come from BC Hydro. Would have to have quite a bit of ice on the river to create a flood.

Grande Prairie Unsure. Many floods to date have been from natural causes: haven't been that extreme. Shouldn't spend a great deal of money on it right now. However, human causes such as clear cutting can create problems. Forestry is responding and should try to curb the practice in the future.

Cochrane: $400,00 homes lined up on flood plain. The province should forbid construction in such areas.

Peace River It is an issue but the town has already protected for it to some degree.

Red Deer and south

Calgary Unsure. Natural drainage systems have buffers built in to avoid floods. Development issue also in upper part of drainage. Logging and development can determine whether the systems can handle capacity in difficult years. Under-developed facilities can't handle such things as raw sewage in seasonal water course, storm sewer run off ending up in rivers (heavy metal flush). Is this an excuse to build more dams (that we don't want)?

Calgary 2 Not necessarily a safety threat. Need to be aware of how and where we are developing to minimize threat of flooding.

Some questions appear to lead to predisposed answers. Flooding: tough luck for the person who lives on a flood plain: is this leading to building more dams?

Stettler People encroach on riparian areas: learn how to avoid problem.

Flooding is preventable. Land cover - wetlands and riparian management should be part of a management plan.

Need to have some laws or controls in place such as not allowing a hog farm in a flood plain (contamination).

A lot of flooding has been caused by removal of forest. Majority of land west of Highway 2 is not good for agricultural use (forest cover and frost) - it's a recharge area for our aquifers. Aquifers are not what they were in pioneer days.

Yes, flooding poses a threat but don't know whose fault it is. Should government be responsible? Education would be one way of solving problem. Buffalo Lake - dry areas can flood. People need to understand where the water could come in certain situations. Do some advance planning where people might be affected (flood plains).

Hanna Flooding will not pose a threat in our area.

Lethbridge Depends on time frame but need to be proactive and prepare for those cycles. Have to think longer term. Dikes in the wrong areas can cause worse damage (Mississippi).

If it did flood, it definitely would be a threat, etc. Not a concern here. Whether this weather pattern is a blip or a forerunner of more of the same to come - we don't know. In 1995, we saw the kind of damage that took place from flood. In dry areas, flood waters are dangerous due to the way the water courses flow. Water table has dropped, those places are interesting to watch if we do get a lot of moisture in a hurry. Should be taking some precautionary measures even though flooding seems unlikely at this time. Our ability to control that water flow is somewhat restricted.

Medicine Hat Unsure. Unfamiliar with flooding in this region. Issues are about allowing development in flood plains. Up to department to provide more information on water levels in flood plains. Too much water coming out of mountains in an uncontrolled fashion (due to clear cut forestry) will lead to a trend of more flooding.

Red Deer Two parts of statement are not necessarily mutually inclusive. Safety may not be a concern but potential damage and economic costs could be.

Not regarded as a major problem for the Red Deer River. Land use planning to prevent development in flood plains is important. Flooding is a natural phenomenon that happens from time to time with some benefits. Not necessarily bad.

I. Knowledge about Alberta's water systems and knowledge about how to use water wisely will become important

north of Red Deer

Edmonton	There probably is a lack of understanding of the scope of water management in the province. Many don't realize how water is used and stored.
	Need to know if we're doing the right things. Are crops grown in the right areas? Recreational use? Need to consider all aspects respecting watershed and treatment of water.
Westlock	This is a key element: if we learn the extent of the resource and regulate to use it wisely, it will help alleviate a lot of other concerns about having enough water, good quality water and its impact on economic growth.
Rocky Mountain House	Some sort of strategy is important. We need to define situation and get a sense of the direction that is needed.
St. Paul	Agreed. Important to have proper knowledge before introducing new policies. Need proper research to ensure we have healthy, long-term sustainable water sheds. Government may be forced to do quick fixes which may affect the long term sustainability. Education on the wise use of water is very important as it becomes more valuable.
	Knowledge only goes so far and only has so much clout. Need to look to other strategies to make us use water wisely.
	How much water is exported in Alberta? For instance: how much cattle is shipped - they are 98% water. Export beef jerky instead. What about grain that is sold all over the world? Dry it here. If our industries learn to use less water, it's better for all of us.
Fort McMurray	Water has not been used "wisely" since the economic boom (Leduc #1 well). Economic growth is spoiling our environment and Aboriginal people are allowing it by not acting on it. We have lots of traditional knowledge. If you want to be "wise" - ask the people who know.
	Has always been important - should have been recognized as important before now.
	Utilize traditional environmental knowledge from First Nations to enhance understanding of what water means to us. Should be included in all workshops throughout the province.
Grande Prairie	Disagree that we're doing an effective job of educating. I received more knowledge about water than my kids are getting now.
	Already important. We need more knowledge about the use, reuse and proper allocation of water.
	Already educating. More knowledge will take us further.
	Improved technology will result from more knowledge (assist in wisely using resource).
	Will political decisions be based on knowledge?
Peace River	Need more information about underground water systems. How much water can we use out of our aquifer and still have it be sustainable? Don't currently know enough to determine whether we can add an industry to the users.

High Prairie It's ludicrous that municipalities in southern Alberta don't meter water. Also, probably twice the volume of water going into irrigation would actually get there if proper maintenance was done on the systems. Lots of issues for people in the south that need to be addressed.

Red Deer and south

Calgary In future we'll have to rely on solar power and wind power rather than hydro. As glaciers recede, we'll depend on snow pack and rainfall in the summer. Supply greatly diminished. Have to have a system that will divert the water straight to the ground and use water more economically. If we export electricity made from water - we're actually exporting water. Still have to allow 50% of flow to neighbours. Water in urban areas has to be managed closer (watering lawns may have to be foregone).

Calgary 2 Have to look at how we use water: watering lawns, mid-day watering with evaporation. Education is important too.

Industry should have closed loop systems. Comes back to education of general public to use less water (water meters).

Provide new technologies to reduce the amount of water used by municipalities and rural areas.

Pig farming could be used to generate energy. Don't wait until oil and gas runs out to force new technologies. Put aboriginal people to work cleaning up the environment. Technologies are available but we're more concerned with selling oil and gas.

Australia is way ahead of us in reusing and recycling water. Other countries are light years ahead of us.

Concerned about the unrestricted use of water as a recreational playground (riparian areas west of Calgary) resulting in devastation to watershed areas (e.g. Ghost Waiporous). In order to preserve these areas there has to be better management and less jurisdictional confusion about who's responsible and clearer rules that are enforced. The Bighorn area is a big part of Calgary's water supply. On a busy weekend in the Bighorn recreation area there may be 1000 people, without a sewer system. This is urgent - there should be more concern about this.

Second to irrigation is commercial and industrial use. Would like to see a lot more incentives for industry to recover and reuse water. The volume used for deep well injection is huge.

People are already collecting their own rainwater.

A litre of store bought water x 45 gallons is more expensive than oil.

One of three we considered most important: knowledge (as it relates to lack of knowledge). For instance, we have some fears about diverting water from one basin to another - do we have the knowledge to do that?

Need to be very aware and responsible of how we are using water.

Stettler High importance. Strongly Agree. Water conservation will not necessarily happen until people are informed about water resources (e.g. City of Calgary, Glenmore Reservoir - don't have meters - cost to processing). Where water is abundant at this time it may not be perceived as a problem. High volume users should use water wisely. Government has limited resources: anything we do in water conservation competes with other issues such as health, education. If there's no perception of water shortage in the cities, it will not be supported.

Hanna Have to have knowledge to make informed decisions. Agree.

Lethbridge Agriculture uses the most water - have to focus attention there.

More education - water not always being used efficiently. Reward those who are more efficient with incentives.

Most water gets used by toilets - just changing those to a more efficient model would create a huge saving in water use.

We should learn from such as Japan before our population reaches that density. Need political will as well.

Some government responsibility to train people about water use. Education across the board.

Agreed. Present tense not future. Need to give Albertans a better understanding of water issues. Incorporate it into the school curriculum is one method (provided it gives a balanced view).

Use efficient toilets such as one seen in Japan where the sink is on top of the toilet to wash hands (uses same water that flushes toilet).

Medicine Hat Very important - becoming more important. The pressure is on volume users of water to justify their volume use to people who may not understand the real benefits of that volume use.

A family of 5 uses 176 gallons in winter and 319 in summer. Significant amount of that goes into the grass. A family of two uses 99 gallons in winter and 403 in summer - it still didn't save the grass. If you only need 99 gallons to live on - do you need 400 gallons to keep your grass green?

Concerned about the wording "how to use water wisely will become important." The oil patch uses as much water as Edmonton, Calgary, and Red Deer combined. The majority of this water is pumped down wells for flooding - lost permanently for use. Doesn't go back in the system. Serious situation that is not being addressed.

Don't think much of that idea.

Wording is not appropriate. Ongoing issue for southern Alberta - is already important.

Use salt water as we did off-shore. Build pipelines to bring in salt water.

Red Deer Agree that it is important now and more so in the future. Education or legislation or a combination is required. Focus on other than residential use which is only 5% of use of water. It's folly to grandfather water use until property is sold (may include seeping septic systems). Environment tends to suffer when industry and dollars are involved.

J. Effective water management will require significant investment in infrastructure (e.g. dams) and the maintenance of that infrastructure

north of Red Deer

Edmonton

We need to move away from large lagoons (municipal projects) and start getting real community-based recycling of water. Costs one tenth the cost of major structures such as lagoons.

Disagree. There are other ways to manage and conserve water besides dams and infrastructure. They cause environmental damage. Needs to be thoroughly researched.

Implies that major infrastructure is the only effective method of water management. Can occur without use of dams or other major structures. Learning to live with what nature can give you. It may be possible to have some smaller in-stream facilities that still allow for flow. Major diversions have a limited life span and require ongoing maintenance. Thought and planning required.

Westlock

Concern re cost of building dams: we do have a relatively large infrastructure already that is the wetlands. As watershed groups grow and learn, they realize it's just not the creeks and rivers that make up the watershed - it's the entire picture. A lot has been lost to drainage. Watershed-based planning with a bunch of different people at the table.

All depends on kinds of solutions proposed. Yes, dams are expensive.

Rocky Mountain House

Don't agree with investing in infrastructure. Instead of building a dam to save 30 farms, give the farmers the money and let them retire.

I recommend that we include Americans in the dialogue because they have the money to build dams - those dams brought the industry that has headed off poverty in some areas. Americans have the capital and the resolve to get it done.

"Effective water management" will not necessarily result from "significant investment in infrastructure." The two don't necessarily go together. Look at what's happened historically and do more significant studies.

If there's a problem, we could solve it by having more dams in the rivers. The Red Deer River valley could hold a lake about 28 miles long - 10 miles wide - and could produce power for southern Alberta. If Saskatchewan gets 50% of the flow, let's keep more in Alberta, solving problems in both power and in water volume.

Dams need to become part of the water strategy.

Don't need large dams.

St. Paul

Would be expensive. Would fit the dreams of many people to dam northern Alberta and pipe the water south. Disagree.

Can't see government paying for it. Leave rivers to flow as they were intended.

Fort McMurray

What is meant by that? At whose cost? Are there plans for more dams?

Grande Prairie

A dam is a poor use of funds - shouldn't be constructed.

Dams for irrigation and hydro electric power can't function unless reservoir is full. Doesn't prevent flood damage.

Not big projects: prefer assistance to municipalities to conserve water. For instance, a high percentage of water is used to flush the system (takes out magnesium and iron) and then becomes waste water. Assistance with a settling pond or other system might be beneficial.

Disagree. Might be more cost effective to invest in conservation, education and improving technologies.

Perhaps investigate multiple pipe systems. Then we could deliver different types of water for different uses.

Peace River I question whether the province should spend that amount of money to support a relatively small industry. Moving agriculture north has some strong merit.

Red Deer and south

Hanna Agree. Dams, weirs have to be in place to manage water. There are also environmental concerns involved.

Lethbridge On-stream storage allows us to protect the aquatic ecosystem on that river. If stored off-stream - can't get it back in river if required.

Experience and time shows that water storage is beneficial to southern Alberta.

In U.S. they have 2-3 years of water storage. Our storage facilities are small compared to what we use. Caused problems in the last few years. Important to have more storage.

Have technology to use water wisely. Need to spend the money to get the water to the right place at the right time. Avoid waste. Investment would improve efficiency.

Additional storage may be required to sustain growth, especially for the long term. More is sent to Saskatchewan than is needed.

Concerned by idea that there is no environmental damage when dams are built. Old Man River was low due to amount taken off for agriculture. Needs to be managed.

Disagree that investment in infrastructure will solve anything.

Our storage is small compared to Saudi Arabia. Somewhere in between may be more effective. No need to rely on weather.

Not dams (focus on off-stream storage). At the Old Man Dam hearings, the first recommendation was to dismantle the dam.

Medicine Hat There is no option but to investigate water storage - both on and off river. Historically, urban sites (of any size) have developed along rivers. Agriculture also comes off rivers (for the most part). Last two years have provided us with a vivid example of why we need storage. We would have basically had someone else's effluent for water without the Old Man Dam.

On-river storage (dams) seems to be the most effective. In the case of the Old Man Dam reservoir, it only covers about 6000 acres. In comparison, it holds a great deal of water due to its depth. Off-river storage doesn't normally have that depth.

We should be spending money on off-river storage. High flow water passes through the system without much use made of it. Ecosystem and recreation benefits. Better than dams, that cause disturbance to wildlife.

Dams haven't been done effectively - you can repeatedly dam the same river. Dams are used for flood control and power generation on Boise River by the City of Boise and they have saved the city time and again. Off-river storage depends on fairly shallow coulees that have a high evaporation rate - not economically feasible but still needs to be looked at. Some haven't been used in a 100 years. Investigate and then proceed and build some of those necessary storage areas.

Two methods of off-river storage. 1. Dams. Old Man Dam - what would Lethbridge would have been like without it? Rationing would have been much worse. 2. Make cities have a lagoon to hold enough water for a year. Study in Calgary to take water from reservoirs to north of the city, not putting it back in the system. Edmonton dumps sewage in river. Should control what goes into the river (run off). Can it be stored elsewhere and used for other purposes? How do they handle it in Europe? Maybe if intakes were below your outputs, you would pay attention to what goes in the river.

Keeping effluent water out of river won't happen. Calgary puts back 90% and we need that water. Should maybe be cleaned up better. If we can store a good portion of a bad year's allocation - we can level up the flows and the better it is for the river.

On-river storage is essential. Lake Mead (Vegas) 600' - 45 miles long. If we could put a dam on the Bow River. The 90% dropped back in from Calgary - with a dam we could catch the spring off - the dilution factor would be there and pollution would become insignificant. The only way to get potable water in quantity even with large urban areas upstream.

Will likely have to be some investment in managing water to help reduce effects of drier years and store water in wetter years. Should also use water more efficiently, both on the farm and in urban areas. Instead of government putting all money into infrastructure, should also promote efficiency through use of incentives.

Human investment - Believe government cutbacks have caused a challenge (only one field man in the department considering the level of irrigation in this region). People investment needs to be increased to help us deal with these challenges.

Other types of investment that can be made to assist in managing water. Managing inputs or managing storage. Needs much more discussion.

Red Deer Infrastructure doesn't have to be big. We should investigate riparian zones, subsurface irrigation and other types of infrastructure that will help us naturally preserve the water.

The Dickson Dam has flooded out a great deal of no. 1 soil. If you keep building dams where there is good soil, we won't have enough land for agriculture to meet the needs of growing populations.

Does southern Alberta want to bring water in from other parts of Alberta? The provincial government has agreed to fund, but not the federal government.

I would reword: "ineffective water management will require significant investment in infrastructure..." There are other ways to address the problem. 15 years ago we agreed to plan on a basin by basin system. Government has been slow to do the baseline research to find out how these flows work. This seems to be pushing the panic button: we're considering things that I thought were ruled out years ago. Let's do our homework first.

We're giving too much water to other places when we can't sustain our own needs.

Wording seems to imply that dams are the only type of infrastructure. There's a lot more to it than that such as community pipelines, water treatment and sewage treatment plants, etc. Agree all of that will take a significant amount of money. We've taken water for granted for quite a while. Need to conserve what we have and make more efficient use of it.

Q. Are the PFRA involved in moving water from one area to another? A. (Participant with PFRA) There is a proposal under the Infrastructure Canada-Alberta Program, a joint government program. It's a large project in southern Alberta to deliver water from west to east. It's supported by the provincial and federal governments and the producers in that part of the province. More information available from Alberta Infrastructure.

Agreed that we would have to spend a lot of money to improve our infrastructure – especially if you want to move water from the north to the south.

Encourage the government to support new technology and invest in new ways of recycling and treating water that will be more economically viable than what we have currently. Invest in research and development.

Are there any additional challenges that should be considered?

north of Red Deer

Edmonton Narrow minded to limit challenges to three choices. Most important that a comprehensive watershed management plan is put together that includes everything.

Needs to be a commitment made by the government to put some resources in this area. Mapping groundwater, scientific research into water quality or into technology of conservation. Nothing on enforcement or monitoring.

Need to work together, rather than letting government go its own way.

All challenges should read "is" rather than "will."

Westlock All are important. Difficult to interpret. Such as building dams - doesn't make sense. Messing with watershed. Draining sloughs.

Rocky Mountain House Challenge: Government responding in a timely manner to solve a problem without getting bogged down in bureaucracy.

Provide a number where we can phone in violators.

Non renewable use of potable or surface water for oil injection is a practice we see as a challenge.

Don't put water where we can't reuse it and it is lost forever (oil well injection).

The amount of water being used for oilfield injection is more than that used by Calgary, Edmonton and Red Deer combined every year. Policy is already in place to make companies look at alternative technologies but there is a lack of enforcement. The strategy should be to look to the existing regulations, stiffen penalties and put people in place to enforce them. Such things as water wells drilled illegally or where the soil is not replaced or finished properly creates a problem with livestock contaminating the wells (water).

No matter who we represent, we are all part of the problem and therefore we all have to be part of the solution.

Government needs to make industry look at different technologies. Government must enforce regulations that are already in place at this time.

Implement and enforce existing legislation, policy and programs. Why are previous consultations (e.g. wetlands policy) or current river basin planning being ignored in this strategy?

Not sure whether a new strategy is required or not, rather I think we need enforcement of existing policy.

Fort McMurray Where does tax come into this discussion? Will water be taxed?

Can't prioritize these challenges - you must consider all of them, and more as it continues.

When water rights under the 1930 natural resources agreement were transferred to the provincial government, there was no consultation with First Nations. Nor was there effective fiduciary responsibility to the people, First Nations or other people who inhabited the land.

Challenge: Need to address trans-boundary issues with other provinces and territories.

Peace River Our water use is horrendously inefficient. Europeans use only a fraction and yet their economies still thrive. We can do better.

The water needs for individuals, families and recreational use should be a high priority.

High Prairie Sustainability of ecosystems in undeveloped areas (which is most of northern Alberta, B.C. and Saskatchewan): if you drop the water table dramatically, it will affect those ecosystems.

Let's get to the point: Minister is from the south - this is just a grab for water.

Red Deer and south

Calgary Population growth is a major factor in water strategy.

Hydrogen supposed to be fuel of future (produces water).

Calgary 2 It's a misnomer to assume that now is the starting point. Many of these strategies are already happening (already developing in places where water is scarce). Our current strategy of taking water out of the river as fast as we can has to be changed - we need a "new" strategy.

Don't throw out any of these challenges - they are all important.

There should be acknowledgement of the importance of water management from individuals to highest level of government. Water is far more important than oil, gas, forest, minerals, agriculture - all are nothing without water.

Water is going to be the #1 issue in Alberta.

We should be thinking about exploring and using the natural systems that are in place instead of putting in dams with open reservoirs. Also, explore storing water under the ground if we have the geological resources (reduces evaporation and leakage).

Stettler Q. What percentage of Alberta's portion of the river systems flow is already allocated in Alberta? Is the Red Deer River already over-allocated? A. Very small percentages of northern rivers are allocated at this time. In southern rivers (each year varies) - we owe 50% to Saskatchewan - our allocation approximately equals our share to be allocated.

Q. Our allocation is used up before the water gets to Empress? A. Yes.

Q. Allocation in southern part of province: Is Red Deer River basin making up for overuse in southern Alberta? A. Don't have complete information on that yet. Currently trying to tabulate numbers (potentially true).

"Used" and "allocated" are different terms. The amounts used varies, whereas the allocation is set.

Hanna Agriculture should be the top priority for government. What about limiting urban growth?

Lethbridge The arid lands of southern Alberta and Saskatchewan, if provided with water from the north, could remove a great deal of green house gases from the atmosphere.

Red Deer We have to consider recreational use of water in a water strategy. Sustaining natural beauty and wildlife habitat. Sustaining fisheries.

Should our water be an economic commodity for sale to the U.S.?

Our watersheds flow into Saskatchewan and the NWT. I feel it's equally important that we develop a national strategy and that it's development with the other provinces and stakeholders.

achieving safe secure drinking water

question 6: private systems

Participants were asked to discuss whose responsibility they felt it should be to:

a. Monitor the quality and safety of the water supply for private water systems

north of Red Deer

Edmonton Unless there's industry that's taking water away (in the aquifer) - then the industry should pay.

Individual pays.

Depends where you live. If a small hamlet, village or town lagoon system springs a leak - who's responsibility is it if it's running across your land?

Amount of testing required by province has decreased drastically over the years. Federal government tells me it's the provincial health authority's responsibility to ensure clean potable water.

There is a shared responsibility currently - health department does do the testing - individual has to take sample in for testing.

When potable water is delivered in a municipality - you pay. Private system owners should also pay for it. It is a shared responsibility in that the provincial government assists by relaying the information to them.

Rocky Mountain House It's up to an individual to monitor the supply for his own family. Regulations say we must have the government monitor where there are problems occurring in the aquifer. Problems caused by industrial activity (drilling holes) all over this province. Need to cover up those holds - can't stress enough.

Labs are provided by government - therefore it is a shared responsibility (department of health).

If you're drinking it, you should be responsible.

Peace River Individual's responsibility.

There is a shared role if you have the water tested. Access to testing.

High Prairie I see no mention of protecting ground water quality. An obvious thing to look at: cross contamination of aquifers, steam injection, etc. Seems suspicious that it's not mentioned because it is an issue across the province.

I believe the legal interpretation is that if you own it, you're responsible. Following the transfer from the federal government, the province claimed to own all the water so they are responsible for maintaining the quality.

In order for private systems to continue we need someone protecting the sources: rivers, lakes and streams. Also, municipalities don't have much say in some of the industrial development which could potentially contaminate their water. Province gives these approvals so they are responsible as well for any contamination to an area.

Red Deer and south

Calgary Pollution should be dealt with before it becomes a problem.

Should be a shared responsibility. I am required to test and put in a system even though my water has tested repeatedly clear.

Alberta Environment is responsible.

Stettler You should have to check to make sure someone has not contaminated supply.

Private water is in the vast minority. Large majority have to help. At best, it should be a shared responsibility. Individuals cannot be own authors of water supply. Local government should play a role.

Owner should be responsible. Use common sense to avoid contamination. If an oil company pollutes your water - you can't be held responsible. Average person doesn't have qualifications to test.

Those on public water systems pay dearly. I don't want any interference on private systems.

Hanna Owner's responsibility.

Shared: Private citizen is responsible but to get water tested is expensive. Can we get testing compliments of the government?

Medicine Hat Private systems are a lower risk because they look after themselves better. Government needs to keep out of it. I have more concern for my safety than the government does.

Costs should be borne at same ratio as if you were living in an urban municipality (testing). I'm responsible for taking sample in and getting it tested. No assistance is a disincentive to getting it tested and having safe water.

Shared responsibility.

Shared. I have no control on what's happening elsewhere in the aquifer so I should have assistance in getting my water tested.

Owner's responsibility.

Q. Do urban municipalities receive funding for testing water? A. Operational costs are borne by municipality.

b. Develop pipelines and regional water supply systems (water co-ops) to deliver an untreated water supply to individual rural residences

north of Red Deer

Rocky Mountain House Morning Glory Regional Water Association - 11 farms put in system 30 years ago. It's not just putting in the system, it's if somebody wants to add - there are conflicts about new lines over properties. The municipality should be given the authority to force right of entry to allow for expansion.

Peace River Sometimes government intrudes where it shouldn't. It should be the choice of the people.

Berwyn gets untreated water from an aquifer. Don't need to treat it - it's tested weekly and is excellent quality water. Because of definitions in the Water Act it becomes a problem because it's not treated. This is something that has to be addressed.

Untreated water is also potable water - it is drinking water. It could have a warning on it: drink at your own risk - but people should be allowed that choice. Don't legislate that potable water has to be treated. People should be able to choose.

Municipality could play role.

Q. Why do we need to treat water if it's perfect? A. (Dave) For water that is piped, it reduces risk. Pipelines can break or leak and be contaminated.

High Prairie Environment doesn't enforce water quality regulations as much for co-ops with treated water - so we are therefore running at a higher risk should the lines be contaminated.

Red Deer and south

Calgary A lot of water co-ops are responsible for providing treated water. We treat it and are regulated. Responsibility currently largely rests with co-op members. Don't necessarily comply with Environment's requirements - may need help from government.

Stettler Q. Why is the term "untreated" water used? A. Many co-ops in province provide untreated water.

What guidelines would be used for this water? Who sets them? I believe it should be a shared responsibility.

Related to water source. Private systems could contaminate other users. Similarly, oil wells can contaminate. Private systems can be threatened by other users (based on location).

Water testing is paid for by users of facility (same as public system).

Co-ops are private systems.

Hanna User pay.

Medicine Hat Congro water co-op formed 10 years ago. Government was initially generous and funded 75%. 10 years later we upgraded and then it was 50-50. Sore spot in southern Alberta. For a lot of farmers it's their only source for water. Federation of rural co-ops is trying for a policy of assistance to get these systems going. During good times, put in these systems. When bad times come, you're ready for them. Shared responsibility.

Government should be involved in financing these co-ops to use water in a better way (different sources). Have to careful about how much involvement government has later.

c. Develop individual water supplies (e.g. well drilling, dugout construction, water hauling)

north of Red Deer

No discussion.

Red Deer and south

Hanna User pay.

d. Pump water from distant sources to dugouts during times of drought

north of Red Deer

Edmonton Producers pay a fee for renting equipment - but at a reduced rate - it's a shared responsibility right now.

Rocky Mountain House If one person in an area is affected by drought, surely his neighbours are also affected. They would get together and share the cost. Proper water management would cure a lot of these problems before they occurred.

Landowner's responsibility. Government should stay out of it.

Peace River Municipalities and provincial government are already involved. Large amount of money invested in equipment that is only used rarely. Helps individuals. Shared responsibility that should continue.

Red Deer and south

Calgary Policy of helping farmers drain wetlands has been a cause of lower water tables in aquifers. Should abolish.

Groundwater is a very untried source. As glaciers disappear - less groundwater. Piping it might be an answer but from where? Should be a shared responsibility. Also investigating deeper wells.

Q: Do hydrological maps show where ground water is moving so people can determine what and where for instance cattle can be sustained? A. (from audience) maps from 1970s are currently being updated.

Happening now in High River. The water table has dropped drastically. Dugouts are banked up as livestock and crop farmers try to dig deeper or re-drill wells - huge expense. Individuals are bearing the cost currently. Years of bust go with years of boom. Owners responsibility.

Hanna	Some things are out of our control. Can't drought-proof for every circumstance. Government should provide some support in those instances.
	Define "drought" (different levels perceived in different areas). We need to plan before drought comes. Can't ask government to bail us out of everything.
Medicine Hat	The government has offered this program for some years. We're in business but how much can we ask the public to support our business? Are we a valuable enough commodity so that people want to keep our business alive? Nice to have, but we shouldn't expect help.

Add your own example ...

north of Red Deer

Grande Prairie	Add another level of responsibility: the industry that may be responsible for polluting the water - they should assume responsibility.

question 8: small municipal systems

Participants were asked to discuss whose responsibility they felt it should be to:

a. Supply technical advice to small municipalities about facility operations, maintenance and monitoring

north of Red Deer

Edmonton	It's not that the small municipal treatment systems were inadequate but that the operations were. Proper funding is required for operations - the plants are technically able.
High Prairie	The problem is that municipal councils rarely see training of operational staff as a priority so it should be a requirement tied to the grant for the facility that the staff are trained appropriately to run the facility.
	Province is incredibly hands-on with providing advice (Internet reports can be done daily now, they specify the requirements for testing). Whether they're enforcing them or not is another question. We'd actually like more money to operate. The rigour of their enforcement mechanisms has certainly increased since last year.

Red Deer and south

Calgary Small communities cannot maintain provision of quality drinking water. Should have same access as people in city.

What happens to waste water going back into river? Large cities have leading edge facilities but smaller municipalities cannot afford such. Points to regional systems. Calgary currently takes waste water to treat and supplies clean water to smaller communities around Calgary. Calgary taxpayers pay for that infrastructure.

Private septic systems not treated as something Environment should address. Lots of people on relatively small parcels of land contaminating water. Need to rethink how we handle.

The same body that governs setting up water treatment plants should offer some sort of grant or revenue. No grants are available for small communities. No funding for co-op wells? Municipalities have a body of people who pay taxes - 4 or 5 in a co-op does not have a tax base. By not supporting them, taking away their economic growth. Funding should be across the board. It's the Province's responsibility - not municipality as they don't make the law.

Stettler Pay close attention to Ontario's enquiry results (for guidance).

Currently municipality's responsibility. Alberta has strict requirements compared to other parts of Canada. The cost should be borne by members of community. Disadvantages: good supply and treatment attracts industry. Government encourages regional systems - they then can incorporate you whether you wish it or not. Education of municipal staff costs money and has to be charged back to users or taxpayers. With smaller urban municipalities, government pays 75% of upgrading (capital costs). The capital costs can sometimes be higher than own system. Lose options/possibilities.

Hanna All of us are responsible to make sure every Albertan has the benefit of the expertise required to supply safe water.

Medicine Hat Limitations are placed on communities by provincial regulations and statutes. There is a long delay to change those policies when new technologies become available. Nervous about government providing that advice - new companies and technologies should be able to circumvent the system and given the opportunity to pilot new technologies. Too much lag time. Need some mechanism to speed up process especially as systems become more and more expensive and more technical.

Small water systems - need to rethink the issue of whether or not every gallon needs to be treated to the standards for drinking water when clearly not all is used for drinking. In house-treatment for water that will be ingested (or bought water) is clearly a feasible alternative rather than saying the government should pay to treat all water to the high standards for drinking water.

Dakota is putting in rural water co-ops and are moving water up to 600 miles. The responsibility is shared between three levels of government.

Missing: Government changing the rules for water treatment plants. Changing the rules slows our plans down by 50%. Technical upgrades are the government's responsibility if they are required by the government. For new plants, it's a shared responsibility. If they ask for additional water tests - should be their responsibility. Advantages of scale are lost in small communities. Additional requirements slows down production of useable water, we run out.

b. Monitor the quality and safety of water at small water treatment plants

north of Red Deer

Rocky Mountain House Shared responsibility. Small communities don't have resources or technologies but also cannot totally abdicate their responsibility.

Municipality should monitor. Province's job to see that it gets done.

Government shouldn't download to small municipalities that have a small tax base. Shared responsibility.

High Prairie Funding is 75% from provincial government and 25% from municipality for systems in small municipalities. Province should play a role in seeing how these systems are run. A. Those facilities are approved by AE and have standards and regulations that must be followed.

Red Deer and south

No discussion.

c. Develop regional water supply systems

north of Red Deer

High Prairie Regional systems are a good thing: running lines to smaller communities that don't have the resources to operate their own treatment plants. You could put in a huge water line for this area (Peace River, Slave Lake and High Prairie) and delete all the little systems. The bigger the system, the higher qualified people you can get. Some of the hamlets are doing the best they can but don't have the resources. Definitely at risk.

Do have regional systems here. Think it works well. Provides some economies of scale.

Red Deer and south

Calgary The cost is paramount. Heritage Trust Fund - lend it to municipalities such as Calgary to develop regional water systems at no interest. It's one way in which smaller municipalities could be helped out.

Evolving school of thought to manage decentralized systems (replace single septic systems). Government needs to accept their additional individual systems that work and are cost effective. Need to encourage. It's an alternative to hooking everyone up to million dollar systems.

Bow River Water Shed - testing 8 or 9 years - septic systems could be a time bomb if we're not careful. At that time, the water was pristine (upstream for Calgary), downstream was not useable for irrigation. Storm water run off from driveways, fertilizers, etc.

Infrastructure needs to be maintained and replaced. Initial loans may be fine but don't address the long term. Need more sustainable answer. Concern with regional sewage system - sending sewage to Calgary - what happens when there's a pipeline failure near a water course?

Hanna If Edmonton received provincial grants to develop their system, why can't another community apply? If Hanna needs assistance they should have provincial funds available too.

Joint responsibility. If community is willing, government should partner with them to help it happen.

The bottled water people purchase - there are no standards on that.

Availability of bottled water much more evident. Trendy but not indicative of water quality available.

Bottled water: there are lots of hoops to jump through with the Health Department and Customs Excise and Measurement. It's mandatory to send in water samples every two weeks - province pays for them. Labels have to be specific: spring, reverse osmosis, or distilled.

Add your own example ...

Red Deer and south

Calgary Government should provide technical assistance. Also list of approved water treatment system suppliers.

reliable, quality water supplies for a sustainable economy

question 10

Participants were asked to discuss how the provincial government could respond if river basins become fully allocated.

a. Determine groundwater availability throughout the province

north of Red Deer

Westlock Definitely in agreement. How can you make good decisions without knowing?

Rocky Mountain House	Q. Already doing that - why is it here? A. (Ed) In 1963 an umbrella study delineated aquifers available for use. However, did not cover whole province or was adequately mapped. Province knows where the water is. Wells have been logged. Snow pack is where they measure the water. Where did all the water studies go? This is well covered - don't spend more money on it. Not so sure - whatever is missing should be done.
Fort McMurray	Is the technology even available that allows us to determine the amount of water underground? Could you also identify how far those aquifers go - a heavy user miles away could have a large impact on the amount and quality of that water. Don't know what the oil and gas companies are doing underground. Shouldn't allow pollution of groundwater, where will we turn when surface water is gone? What about focussing on rain water - accumulate over summer? Very expensive proposition. Used to get water at 65' as a boy - now go down 200' to 700'. Just to determine the reserve would be cost prohibitive. How can you build an effective strategy without knowing the inventory of water available?
High Prairie	Believe there is a potential to start looking at groundwater. Sounds like a good idea, but worried that we don't know enough about the intricacies of groundwater work right now. Worry about drilling into it, etc. A slippery slope to start down (investigating becomes a report that becomes a plan, etc.)

Red Deer and south

Calgary	Government should. Groundwater is unknown at the moment. If you don't know what's in your aquifers how do you decide if you can allow further development? Have to know whether it will sustain. Can't get answers now. Well logs - fresh water - pretty hard to determine. Serious problem attendant on discovering what resources are - no governor on mining and exploitation conditioning. As soon as we know resources - much more rapid depletion. Would well logs help? Alberta Research Council has done. But out of date.
Lethbridge	Yes. Availability, capacity and location of groundwater aquifers. Also look at recharge capability. Danger if you start to use old water where recharge capability is limited. Do we need to measure northern Alberta? They have lots.
Medicine Hat	Concerned that it may be too costly. Would rather have them monitor and have test areas where they do in fact determine ground water.
Red Deer	Agreed moderately that government should put some effort in. Focus should not necessarily be on available groundwater but on sustaining groundwater. Companies that want to use the resource should assist in compiling data and ensure there are no negative effects of their use. Alberta Geological Survey is a good organization that could conduct this work.

There's a lot of information available but no resources to put it together. Let's look at the data we do have.

Moderately to strongly agree. The way in which it would be done would have to be looked at. All the seismic that oilfields have done – could they share that information? Otherwise would be very costly. A lot of information is available – we need to share those resources and information.

b. Allocate all available water by "first in time/first in right" (FITFIR) rule, then prohibit any further allocation of water in the basin

north of Red Deer

Edmonton Scrap FITFIR and start from the ground up. Use water more efficiently and beneficially.

Westlock Not a good system - doesn't allow most benefit from use of that water. Prioritize the uses.

What's high value to me may not be valuable to you.

Car wash vs. food processing plant - logical pick is for the food processing plant.

Q. FITFIR - could it be placed in urban areas? Would car washes have priority over processing food. A. Yes, that's possible.

Rocky Mountain House Disagree with current structure. Feel that with surface water - as situation and demographics change - there should be a way to change allocations. With groundwater: there is the potential of drying up your neighbour's well. Need flexibility: if you have a bigger license, can't deplete your neighbour's well.

Fort McMurray Dangerous - current users may end up having a greater allocation than they really need. They may never use all they have a right to. Could have a negative impact on a new potential user or even an existing user that needs more water capacity for legitimate reasons.

With the developments in this area, there's not much water available here - all are striving for the water. Don't think it's fair. Many people have been here longer than the industries who don't have a license to the water: including plants and animals.

Grande Prairie This discussion doesn't actually reflect thinking about the future.

FITFIR seems a poor system.

Learn from Aboriginal people - they look ahead 7 generations. What's the logic in changing a process that works? I personally don't know if it works well. Only know that if you overload a system noone makes any money.

FITFIR: could it allow someone to pull from another basin to fulfill their right? There are more voters in the south so they may be able to change the system whether we like it or not - there is no democracy.

Peace River There is a priority built in for human use. However, for other uses, it at least avoids conflicts - is cut and dried.

Concerned that a feedlot that may not be considered beneficial could have first right to the water.

Is it possible that the first license could be a very inefficient user and other users - even if more efficient - could be cut off? A. Yes, although you can't use all the water you want - a dedicated formula is used when you receive your allocation.

Q. What happens if an aquifer's water level drops? A. (Rod) they starting cutting back on use - newest licenses are cut first.

Seems there's little incentive for the first license holder to be efficient with his allocation.

High Prairie It may not be the best way just because we have always done it that way.

Have no problem with it.

Both methods carry some merit but concerned about what value is based on: cosmetic use or survival? Who decides what is a bigger priority or value? FITFIR at this time seems like the only protection I have at this point.

FITFIR has a lot of problems. Mostly applicable to southern Alberta when dishing out irrigation potential. What makes the original farmers more important than my generation?

Red Deer and south

Calgary 2 In the past, sometimes huge amounts were allocated. It was okay at the time- but how does allowing that allocation to be traded allow for any conservation measure or efficiency? A. There is legislation that if water is not being used, the government can amend or cancel a license. Wasting water is not allowed either. When a transfer is processed the government can retain 10% for water conservation.

Q. Do they pay for the license? A. There is only a fee for processing the license.

Essential part of the water strategy. All users need a license. It allows for security and with the tool of transfer you will become more efficient. It's a grass roots approach that builds in incentives for users to become efficient. When transfers are made, hold back a certain amount for water conservation. If society values environment more than industry they could buy back the water rights to protect the environment.

Q. How do you monitor water use? A. Each person is required to report water used and water returned. Staff also go out and monitor (usually during times of shortage).

Q. If pricing came in, how would it affect FITFIR? Now it could be sold? A. (Bill) The person would have to determine if their use of the water was worth the cost and whether to let some of their license go.

Competition for water rights (being bought up by towns and cities) puts pressure on landowners to get out of agriculture: a possible negative feature - land not being used.

Stettler NWT Act - CP Rail got rights to significant allocations in southern Alberta.

FITFIR doesn't encourage effective, efficient use of the resource. Need to encourage efficient use.

Disagree. A difficult question - how you deal with existing rights.

FITFIR must have the right otherwise you are in effect confiscating property.

Hanna What happens to young people who need to set up an irrigation? If we sell allotments - industry will come in and snap them up.

In time of drought perhaps we should share the resource with everyone.

Lethbridge FITFIR - if noone had the hammer would the sharing have worked? Oldest licenses were the most generous. This is a finite resource. Water Act includes a clause for water trading.

Shouldn't we prioritize based on type of use?

Sharing water can be very effective. Is it possible to blend those two?

Who owns the water? Could protect from overtaxing systems but may deter future economic growth. Wrong thing to say in this province. Fundamentally disagree.

Legal implications. If there are fights over water - only the lawyers win.

Industry in our area would not have had access last year if we had not shared. FITFIR okay but shouldn't let anyone go without.

Medicine Hat Points of view range from social obligation to provide new users with a certain amount of water, to obligation to maintain the water quota to those people who have developed the infrastructure.

FITFIR works if water is being used efficiently - what about when water is being wasted and could be put to better use if reallocated?

FITFIR is the only way to preserve discipline in the allocation of water. Discipline provides for not over-allocating. To judge which is the most beneficial use is a sure way to discord.

A lot of investment is based on that principle. Giving it up would undermine the security of my operations.

Red Deer This is no longer appropriate for Albertans, particularly because it doesn't allocate water to the highest and best use which should be the guiding principle. Discontinuing FITFIR will cause a tremendous amount of disruption and won't be an easy process but it's the only sustainable process. Should there be any doubt, the water has to remain in the ownership of the Crown.

Strongly disagree. May have been a good practice at the turn of the century but no longer warrants being continued. Water needs to be allocated to all in a fair way and should not be available for trading if no longer required.

Can't be completely throw away FITFIR: it's the whole basis of the old Water Resources Act and was taken forward into new Act. Registration for agricultural use also works on the same principle. There are more angles to this than first meet the eye at first glance.

c. Allocate water based on its most beneficial, or valued, uses

north of Red Deer

Edmonton Water should be shared - basic human right to water. By 2025, two thirds of the world will have limited access to water. Some will have none. There will be wars over water. We have 20% of the world's fresh ground water. Who has the right to it? Agricultural and industrial uses also keep us alive.

Special interest groups, government entities, organizations or individuals are sometimes poor decision makers. If you look at them as part of a large system (market driven economy) a group decision made by all players or stakeholders is the best vehicle for deciding allocation for the best beneficial use. Domestic needs are addressed first, economic needs are secondary. Preemptive ecologic needs which includes human needs.

Don't agree with premise that rivers are fully allocated. Don't think we can legally get out of FITFIR - would have to buy our way out.

Government can declare a law and throw out FITFIR. Colorado had an area with irrigation in place for 50 years but it was impractical. State bought up the land and converted it back to wildland area.

Westlock Who decides? Who defines "beneficial"?

Shouldn't throw out FITFIR right now - may be amended.

It becomes a difficult decision between different agricultural uses. FITFIR then makes sense because who makes the decision?

Rocky Mountain House Who defines value? Looking at how things change and trying to put a value. Value of water goes with the land around it. If we've got water here we should have the right to use it for agricultural uses. If our water is going south, perhaps we should expect from the government the ability to grow corn up here.

Fort McMurray Who determines?

Grande Prairie Consultation has to be ongoing to provide continued input from citizens into what the values are. Society should decide if certain uses override FITFIR. We would also have to compensate a person if water is taken away for a "higher" use.

Who establishes the value? How much input will people of province have?

FITFIR accommodates #5 (set aside water for future population growth before there are any shortages).

Peace River Who will judge? Will create never-ending conflicts.

High Prairie Money would control who gets the water. Shouldn't be touched at all.

Think municipalities should be first and then others after. Water for people has to be a priority.

Red Deer and south

Lethbridge Concerned it's the wrong question. Define "beneficial" - varies across broad spectrum of interest. A lot of issues come to bear. Too subjective. Allocation should go to highest value (we think food production). Price of food needs to reflect the cost of production.

Value - who decides? Pricing of end product (food) has to go up.

Medicine Hat Beneficial and valued may be completely opposite (i.e. oil field injection may be the most valued but not the most beneficial). If I was rich, I might be willing to pay anything for water but it may not necessarily be for a beneficial use.

With water shortages, a number of farmers were selling their water rights to farmers in other districts who could grow more beneficial crops. That was an effective use of water. People decided on their own.

Politicians don't always make the best decisions - this may lead to that.

Be careful when considering "value." Pure dollar value isn't necessarily real value. Money doesn't buy everything.

Agree that the idea of FITFIR has had its time and may no longer be relevant. Also recognize that people have invested in all sorts of things based on their right to water - can't pull that out from under them without some compensation. Water should be used most beneficially but not sure who would decide.

Red Deer Generally agree but concerned about how you decide what is most beneficial and who makes those decisions?

d. Allocate water to further uses even if this potentially harms aquatic environments

north of Red Deer

Westlock You may have a scenario where yes, I may agree - but who decides?

Strongly disagree - not sustainable.

Rocky Mountain House There is a lack of knowledge about this (allocation, license transfers, etc.). Most of us agreed that we shouldn't allocate if it potentially harms aquatic environments. Do some kind of monitoring.

Definitely disagree strongly. Further, we should have an allocation for protection before any other use is allowed. Ties into items 9 and 10: investigations of open and closed diversions. Definitely disagree for ecological reasons.

Fort McMurray Absolutely not.

Red Deer and south

Calgary Q. Do we determine environmental needs before allocating? A. (Robert)Yes. We try for balance between all things under the Water Act - but no guarantee that one is the first and only consideration.

Methodologies available to determine minimum flows to maintain healthy eco systems. Make this a priority and follow recommendations.

Money gives validity. Bow River brings tourism to Calgary. There are times you can have it all: a recreational asset, a revenue generator and a nice river.

Figure out how to use less water. Use at different times and in different ways but maintain minimum flow.

Lethbridge Red herring statement. "Potential" should be removed. Makes it easier to dispute. We can have win-win situations with this. Doesn't have to be one or the other.

Violates Water Act as it currently stands - it requires enough water is left in rivers for aquatic environments. Would be a major change in current policy.

"Potentially" does belong in the statement. We have a history of waiting until it's too late. We have to be a step ahead.

FITFIR/Beneficial: if more water is allocated than the system can provide - you have to go back to original licensees. Poor way to run the whole system.

Medicine Hat How would we answer if we were starving? It would affect our answer.

No. Strongly disagree. Aquatic environments have been harmed over the years. Serious negative effects. We need to recognize that you cannot build a sustainable healthy economy if you destroy the environment.

Elkwater Water Co-op (55 members) were restricted from taking water out of the lake when we hit the minimum lake level. A student study advised it would affect the aquatic ecosystem. AE realized it was quite beneficial. Need to take another look. Lake dropped due to evaporation not our use. Our water license shouldn't be affected by the lake level (mother nature - levels vary).

Using the water (dams) creates environment changes. But take into account that although a part is harmed, not all is necessarily harmed.

Who defines "harm" to environment?

Red Deer Strongly disagreed. What is the "further use" and what is the potential harm? Any water taken out potentially harms the ecosystem.

The health of fish is an indication of the health of the river. If they are affected adversely if will eventually affect us all.

e. Set aside water for future population growth before there are any shortages

north of Red Deer

Edmonton When considering the use of water for irrigation, what you're producing is an important factor. Why irrigate to grow hay down south when other areas can produce it that have more water? Have a real value to what you grow in drier areas.

Westlock Consider it simple, good water management. Need to set aside resources for future generations.

Rocky Mountain House We must allocate water for population growth.

Grande Prairie If we're short of water - how do you set it aside?

Can't store water.

Q. What about the apportionment agreements between us and Manitoba and Saskatchewan? A. (Rod) We agree to allow 50% of predicted flow to continue over the border.

Red Deer and south

Stettler Some issues with urban vs. rural. Consumptive use is 4.5% compared to 71% for irrigation. Calgary (largest city) - allocation for rural is 45 x the City's allocation. Has to be looked at in perspective. Future population growth: it does make sense but is a pretty small component of use in the province.

Allocation and use: Q. Are there priorities when water is rationed? Would the whole Water Act need to be changed? A. There is no priority for municipal use - only for household purposes of those who live over the water.

Lethbridge If so, municipalities should look at efficiencies also.

Urban population has a duty to limit amount of water they use. Also the irrigation industry. Why are we so afraid to admit there may be a limit to growth? Someday we will reach the limit. Learn from how nature lives within its means.

Cannot physically set aside the water. Do you reserve the allocation - is that what's meant?

Where will you set aside storage without knowing where the growth will be? Will you cap a city's population? Or bring in water from northern Alberta for possible future growth? Difficult question.

Q. Aren't cities and towns already allocated based on population growth? A. Yes.

Medicine Hat Tough question. Not like grain - can't really be stored that way. Generally agreed. Have to consider dams and the problems they create and off-stream reservoirs (evaporation). Agree but don't have answers on how it would be done.

Red Deer Conservation is possible but we don't overuse much.

Uncomfortable with idea of a community having water reserved for them. I would rather it was available based on demonstrated conservation measures rather than a carte blanche availability.

Set a minimum allotment for domestic use. That's a priority right now and could be moved into the municipal area, province-wide.

What type of population growth is expected? How do you tie up water without knowing? However, we should have an idea of what the watershed will support – that will set the limit.

Have to set aside but the challenge is in determining how much? How do you determine the limits of use in a particular area. We discussed pricing controls to help limit use. We also talked about climate considerations that might affect the supply.

f. Allow water license transfers (i.e. an operator not using its full allocation may transfer a portion of that allocation to an operator, or municipality, that needs the water)

north of Red Deer

Westlock Generally disagree. Will this lead to water being for sale? If you place a value on water it makes people respect it more. Water in Edmonton is metered, in Calgary not. Edmonton uses about half of what Calgary uses. Who will decide what is an acceptable transfer? There probably are situations where it would be a good thing to do. Scary unknowns.

Supply and demand would affect the price of a gallon of water?

Oil companies are attempting to purchase water from land owners. Landowners sell the right to access that water. Can be done under the table.

How can you collect money for something you didn't pay for? Shouldn't be available for sale.

Rocky Mountain House

Can see allowing it if user has used allocation more efficiently - even for a price to help pay for more efficient systems. Don't agree where users haven't ever used the water and sell it for a price. Have to watch the whole pricing thing very carefully.

Do not believe that water licenses should be transferred in exchange for money. No dollar value should be associated with it. Water basically belongs to all Albertans. I realize land value is also linked to water but have difficulty with transfers tied to money.

Strongly disagree with the ability to buy and sell licenses for water (commercialization of water). Rather than a person selling their license to someone else - it should be returned to a pool to be reallocated at no financial benefit.

Q. Are you allowed a license for more than your needs? A. (Doug) License issued for intended use plus a small extra amount to accommodate growth (i.e. a municipality's growth) - have to justify.

Q. Industrial/agricultural applications: can they acquire more than they will use? A. (Doug) They are allowed a cushion for growth. If they need more allocation, they have to apply for a new license with a new priority.

Economies and efficiencies have created excess in some cases. Numbers used years ago for livestock consumption were quite a bit bigger than used currently.

Water floods: not necessarily a declining requirement for water. Some operations are looking at doubling or tripling water injection in a 30 year old field.

Provincial government should look at industrial use. Where water is used for production of an oil field (floods), the water requirements decline over time. Lots only using 25% of their original allocation.

Fort McMurray

Disagree. Could they transfer to the states?

For how much? Licenses could become very valuable given the market.

Grande Prairie

You should be allowed to lend it to someone who needs it.

Q. Does transfer mean "sell?" A. Yes it can. You can sell your right to the water.

Has to be some limits to avoid people sitting on their land rights.

If you are no longer using an allocation, you should have to transfer it - but it should go to a like use (agriculture to agriculture).

It's difficult to get new licenses (regulatory process), so why not transfer an unused allocation for instance to a municipality that could use the right to the allocation to expand their system. It's a possibility. Not a totally negative scenario. Take a close hard look. Could happen to the benefit of society.

Peace River

Q. Do southern municipalities have water meters? A.(from participants) Medicine Hat and Lethbridge do. (Bill) Calgary has just passed a motion to move toward meters (2009). About one third are on meters voluntarily.

Q. What happens to the extra water that is allocated but isn't being used? A. (Rod) FITFIR does allow people to predict growth. Water not used is not wasted, it's still in river flow. (Ralph) If someone is wasting water, the government can step in and adjust their license.

If an oil company is the first in time, and the water is deep well injected, the water is gone. In that case, FITFIR is a disaster. Plus oil companies have the money to buy up licenses, etc.

Dangerous situation. Someone who is willing to pay could buy up the right to the water - not necessarily for a beneficial use.

Make it economically attractive to conserve water.

Government needs to instill in people the value of water. Government shouldn't have to pay incentives.

Why doesn't government provide incentives for people to conserve water?

High Prairie In northern Alberta (Little Smoky, Lesser Slave Lake, Smoky River, Wapiti) sometimes licensees are cutoff when flow is down.

Q. Is it true in the States that where water is tied to the land, the right to the water is now more valuable than the land itself? A. It's possible.

Red Deer and south

Calgary 2 Q. How much water is licensed out relative to the water that's in the river. A. (Allan). Depends on river. If water is not being used, it's going to be reallocated. Allocation is based on median flow which changes yearly. Sometimes we're under-allocated, sometimes over-allocated.

Strongly opposed to allowing re-sellers in the market (water transfer). If the farmer doesn't use the water, it should stay in the river. Currently, if there's extra water, we can ship it to the next guy - use it to the maximum to maximize our profits. You can't stop who they sell to, they could sell to foreign ownership (free trade). How much can they truck out of the country?

Stettler No.

Hanna Q. Is it even possible - legal? A. Currently if sell land license is lost.

Water transfers have to happen. When fully allocated it becomes only option unless you put in infrastructure (or both). Downfalls are using water that isn't currently used (more water used); richer markets will pick up option perhaps taking away from original use.

Ability to transfer allocation is one method of individuals who have large allocation spreading it out to other users.

If it goes to highest bidder - is it possible it would move out of agriculture? Concerned about where it goes. Does it work against sustainable agriculture?

Already doing it on a yearly or bi-yearly basis. It should be allowed.

Don't agree. What happens if license owner doesn't even live there anymore - should he be able to hold everyone to ransom?

In areas where water is fully allocated, without a transfer allocation, the government would have to reallocate the resource. As long as an individual is not compelled to transfer his allocation, transfers would prevent government from having to step in and solve the problem.

Agree for instance during a drought situation. Only allowed on a need basis - conditional.

Be careful not to sell water to California - should stay within water basin.

Lethbridge License transfers last year may have been a short term fix but it allowed us to stay in business. Supposed to be better this year, but we needed that fix.

Last year's trading was not water license transfers, it was trading on rights to water with a license. Some licenses are only partially used, these would be taken up in the short term and in the longer term you're back to where you started.

We should avoid water becoming a commodity. You can currently sell the right to use water. This is more of a short term pressure relief valve than a long term solution.

Medicine Hat Already in the Water Act. Not sure how it's working - seems okay. Not many people affected by it. Irrigation districts hold rights for entire district. Didn't see relevance.

Red Deer Agreed. Feel there should be a board established that would include government and stakeholder representatives to manage the redistribution of excess supplies. Very important that province always monitor water in cooperation with municipalities. Allowing transfers better utilizes the water.

Allowing transfers – not against sharing with municipalities. Concerned if license falls into private or corporate hands. Concerned about who will handle transferring and that there might be a price fixed to it.

It's quite clear that there is money attached to this transfer process although that is not made clear in this statement. To attach money is a terrible mistake. If someone profits from transfer of water, it ought to be people in general and it ought to be the ecosystem in general. Let's take the money business out of water transfers: make it a process where it gets used in a responsible way, not based on who has the most money.

If there is monetary value attached to a transfer, it's likely to create a situation where NAFTA might kick in and we lose our rights to our own water.

g. Encourage more efficient use of water through pricing to reduce overall use

north of Red Deer

Westlock Difficult to interpret. Define "pricing". Define how you want to reduce overall use. It has to be reviewed and more clearly defined but any decision is possible.

Not fair to price water - there are other methods that can be used.

Depends on who user is. If agriculture has to compete with oil companies and pay for water - food will become very expensive.

Rocky Mountain House Handle carefully. Tie education into pricing structure. Effective use of what we have. Q. What is definition of word "value" or "beneficial." A. (Ralph) No definition at this point.

Fort McMurray Oil companies don't pay a price for what they take out of the ground (except for royalties). You have to make the distinction of whether you're selling water like a litre of gas at the gas station or just charging a handling fee (like municipalities).

High Prairie People will consume less water if it's metered. Also, unfair playing field: if municipalities bought water, there's also an incredible added cost to treat the water for consumption. However, for oil companies that would buy it and put into the ground - they don't have to do anything more with it. Municipalities couldn't afford to use water for anything but drinking water.

If all municipalities had a good conservation plan in place, and put meters on, consumption would go down quite a bit. All kinds of technologies and techniques are also available.

There should be a charge for water. It costs millions of tax dollars to put systems in place. In the north, many systems are put in by private individuals. Providing water for use by livestock and then turning around and having to pay for it.

People waste water.

To get the best bang for your buck, aim it at the 70% use [irrigation]. What can we do to make that system work better? User pay?

Red Deer and south

Calgary Meters should be on all urban houses in Calgary. You can tell who is and who is not on a meter. Heavy users such as car washes should be charged more.

Q. How is it determined how much water irrigators get? A. (Peter) *explained allocation and FITFIR*. Q. Is it forever? A. If granted under the previous Act, it is in perpetuity. Under the current Act, it's granted for a term and can be reconsidered after that term. However, the government would need adequate reason to deny.

Q. Well water: are there grandfather clauses for those drawing water for years? A. Yes. 26,000 applications were submitted. Someone registering now would have a currently dated license. People who live by a river, by a lake, or over groundwater have a statutory right to that water for household use.

If oil companies had to pay for water being injected in wells (never to be used again) - it wouldn't happen.

Q. Do people who irrigate pay for their water? A. Irrigators pay for conveyance from diversion point to their field.

Water pricing does make a difference. Water meters make one more conscious of use. People with more money will pay for water.

Potential for big business to buy allotments.

Take exception to saying users pay on irrigation. They do get government money to maintain those systems and improve irrigation districts.

Would we use market value and export to the highest bidder? If we start under NAFTA we can't shut off the tap. Be cautious. Government is only thinking revenue. Water sales will be in our future unless we are vigilant.

If only reason is to slow down use - not good enough. If it's to save environment - that's a good idea. If it's to encourage recycling water to ensure protect and preserve the resource - that's good.

Consumptive vs. non-consumptive use. Look at how water will be used (i.e. use sewage water for cooling towers). If you're using water that's non-consumptive - charge less. If it is, charge more.

Challenge objectiveness of question. Reduction in use doesn't necessarily follow pricing. It's a formula for getting large vs. small. Potential for abuse. Creates a new bureaucracy, not necessarily water preservation.

Stettler No. Charging for water may help conservation. But for operations such as the cattle industry, no matter what the price, there will still be a demand - won't necessarily create efficiency. Wording of statement is too broad. Meters on farms not a popular idea.

Q. Doesn't the Water Act prohibit the sale of water? A. That is correct - any change would require a change to the Act.

Hanna Need to develop a conservation ethic. Pricing water is a narrow focus. Have to be careful that we don't end up causing harm to something else to achieve our ends. Pricing sounds like tax - once implemented will just get bigger. May eventually work against agriculture. Currently try not to pump more than we need to but enough to get a good crop. This measure may affect this.

Taxes create money - not necessarily water. Making systems more efficient may be the way to go. Complex issue. Price not always an instigator of efficiency.

Water is paid for now in the cities (metering vs. flat rate). As far as agriculture and industry, the only purpose would be to bring about more efficiency. There's probably a lot of waste now - more used than necessary. Perhaps put in an efficient system and charge a flat rate. There is a price attached to all water regardless.

Lethbridge Population of world will increase perhaps 50%. We will have to find some way to produce that food. A price on water will increase the price on food. Will create economic disparity in the world. Must remain a resource controlled by the province and be available for food produce.

It's inevitable. Spinoffs would be more efficient use, increased productivity, or reduced consumption. There is a legal issue with water being priced (NAFTA). We don't know.

Don't see it happening anytime soon because of complexities and costs involved (metering, etc.). It could come but not soon.

Already is happening - last year growers were monitored (metered) on their consumption.

Encourage volume charges for delivery rather than putting a value on water itself.

User pay a good concept but food is subject to international market

Medicine Hat Disagree. Better to encourage reduced use through education and incentives. Everybody pays in some form. Some high end users can save by being more efficient (save energy too).

Red Deer Agreed in general. Put pressure on having meters. Essential to charge industries. Efficient use of water can be done through education as well as pricing.

I hesitate to put a price on water to control the use. Didn't work with gas or cigarettes or whiskey. People with less money wouldn't get the water they need.

There are already places paying for water to drink. Some municipalities with water meters start with a flat rate for the infrastructure and then you pay for anything over the flat rate.

Municipalities do not sell water. Price reflects the treatment and delivery. Municipal water is essentially borrowed from the system and then put back.

There are other ways of ensuring efficiency besides pricing. The government has a great power to regulate. It has the power to tell industries to clean up water before they let it go or to recycle it within their own industry. It's done in many other places in the world – we can do it here. Not everybody needs potable water for all uses. Treat water in different ways where you don't need drinking water quality.

h. Investigate construction of storage reservoirs to capture water during high flow times, making it available during low flows for new operations

north of Red Deer

Westlock	Theory nice idea when there's lots of water. Works fine if high season is more than everybody wants. How do you determine who gets percentage of high flow? What about future expansion?
Rocky Mountain House	Why can't we make weir dams - every 10, 20 miles to catch the runoffs and retain that water? Keep catching it as it flows. Don't need big dams but smaller storage reservoirs.
Fort McMurray	Problem is you have to flood large areas: you may be flooding sensitive areas, farms lands, etc. Not a great option. Large companies can store a great deal of water which would lessen the availability and drive the price up. Quite hard to save water without any snow. Without snowfall in mountains, there won't be any runoff. Waste of money to invest in storage reservoirs. Have to just live through drought. Already a low flow of water going into Lake Athabasca - river has gone down drastically. Storage reservoirs will further affect flow. In some instances, it can work quite well. Can be important to a water user to store water during high flow periods - could lessen impact on overall environment of a creek for instance.
Grande Prairie	Allocation should match the amount of water available. Protect the old licenses.
High Prairie	Reservoirs have their place - just part of prudent planning. There should be water there if it doesn't rain. Should be investigated. However, they have to be careful about what they may screw up as a result. A good suggestion. If it had been done at Slave Lake we probably wouldn't have to have had siphons over our weir. Often that water just runs off.

Red Deer and south

Calgary 2	There's more water in lakes than in rivers. They are a water source or a place where you could store water rater than building dams. Low depressions could also become water storage areas.
Lethbridge	Investigate is key word. Has to be considered. May not necessarily be accepted (e.g. Meridian). Storage off-stream is a very good idea.

Red Deer Mother nature has a storage reservoir system in place which we have decimated. Recovery of riparian zones should be part of any planned program - it's critical. Requires further direction from province.

We defined storage as anything from a rain barrel to a huge lake. Stewardship is important. Many small contributions add up to a large contribution overall. Climate is cyclic in nature. Don't encourage heavy use activities in low water environments. Small reservoirs are better than large dams. However, if large dams are contemplated - siting is critical. Protect ecosystem but see that tradeoffs may be in our future.

Wondered why this is just for "new operations"? This seems like a variation on everybody having a rain barrel: concept seems sound enough.

I. Investigate construction of closed diversions from another river basin (water goes directly from one basin to an operator in another basin, but does not enter the river system)

north of Red Deer

Edmonton Lots of information in AE's library on closed diversions. Loan guarantees to companies and damage to ecosystem from an environmental and economic perspective - killed the idea. Minister doesn't consider closed diversions to be real diversions (proposed SE Water Co-op is an example of that). Open diversions are river to river. Closed diversions are from large treatment plants supplying small communities - but the water can cross water basins.

Q. If you take water from one river and use it and dump it somewhere else - how is that not an inter-basin transfer? A. (Bill) I think it is.

Westlock Can't seem to manage closed systems now. Don't mess with open diversions.

Rocky Mountain House Following remarks based on assumption that water does not go to another system, or is at least treated in such a manner that organisms are not introduced to another river. This already happens: Innisfail to Carstairs line. It could be investigated but must be handled very carefully.

Fort McMurray What steps would be taken to keep water safe as it travels from one destination to another? Who makes decision about where water comes from and where it goes: federal government, provincial government, the public?

The scale of such operations scares me. 50,000 barrels a day would cripple our river systems.

Grande Prairie Currently in place - already been done.

Red Deer and south

Calgary The ecologies of the two Saskatchewan rivers are quite different. Dangerous to mix.

Provide incentives to industries to locate close to water.

S. Saskatchewan needs help. Both rivers (N. and S. Saskatchewan) join in Saskatchewan anyway so we could divert water from one to the other without causing any harm.

Look to California to see what happens when water is diverted to grow crops. They are a mess.

Transferring water from one watershed to another is very dangerous.

Comfortable caring capacity: if a municipality doesn't have the capacity - they should not expand. Okotoks will limit their population growth. Others should do likewise. That is sustainable growth. Inefficient economically to locate an industry somewhere and then build the pipelines. Put the industry where the water is.

If you transfer too close to the U.S. border, you know where it will end up.

Who would pay for it and who would benefit? Potential users should pay for it.

Calgary 2 Inter-basin water transfer scares me. It's retrogressive thinking - don't muck around with mother nature. Water that flows on isn't wasted - it's part of a hydrological system. The costs of inter-basin transfer systems also has to be considered. Definitely disagree with idea.

Completely opposed to concept of inter-basin transfers We don't know enough to evaluate fully the health effects on the ecosystem from where we draw the water. Also, it does not encourage changing usage patterns.

Q. Are transfers happening now? A. Legislation does not allow transfers between major basins - only in sub-basins and even then it would be examined very closely. Water is being drawn off the Bow and some flow goes back to Red Deer just because of topography. It all ends up again in the S. Sask River.

Q. Are allocations assigned on a yearly basis? Maybe they should be adjusted monthly to account for change in flows. A. Some people do develop their projects to take advantage of run off [high flow] using off-stream storage. In the future, all proponents will likely have to look at off-stream storage.

We should rather be looking at new technologies (i.e. taking water out of the air).

Stettler No need to transfer water right now. Cheaper to move north. If the U.S. wants it, they'll come and get it. If we want their produce, we should maybe give them some water.

Raw water needs to be investigated separately from treated water. For instance, not dealing with pathogens with treated water.

No inter-basin transfers. Concern is that effects are not known on ecosystems (from and to). Big risk to take.

Q. If we did transfer north to south, how does that affect the free trade agreement? Would we have to supply to the U.S. also? A. Information right now is that it is still within our jurisdiction.

Lethbridge Need to renegotiate with Saskatchewan - review agreement.

Need to define "basin." Small basins would be more willing to accept than larger basins. Workbook says water doesn't enter river system. Original suppliers may not want it back with water contaminated. The key word is investigate - should investigate everything.

Cold Lake level is down about 2'. Encourage industry to completely recycle water and reuse it over and over again.

Conceptual problem with moving water between river basins. Pumping costs due to different elevations, etc. would be astronomical. - more money than any government has - we can't afford it.

Red Deer Key word is "investigate." Generally agreed. Strong concern about pipelines. Communities with a large industry would have an advantage over communities without a large industry because the industry could bring in water. Is it appropriate to allow that advantage?

Possibly for domestic use but not for agricultural or industrial use – that would be quite wrong.

Sewage could end up in the other basin. Still a concern.

Currently looking at regional domestic water supply system – treated in Red Deer and sent to other communities. Ponoka would like to be on that system but it would technically be an inter-basin transfer. There are obvious advantages to getting water from a better system. Perhaps we should look at case specific studies rather than sweepingly not allowing. Note from AE staff: Inter-basin transfers not allowed unless there's a special provision such as for drinking water (only by a Cabinet decision). Hasn't been done since the new Water Act but has happened in the past.

Concerned about diversions even if they're not going into another basin. Not enough information to know ramifications. Water is already being piped although probably within the same basin. Large companies would be the biggest beneficiaries. Pipelines would be more efficient than an open transfer. There are cost implications if it's being done by other than a large company. In the past, engineers have tried to adapt the landscape to suit mankind and all such projects have failed. Strong opposition to inter-basin transfers.

j. Investigate construction of open diversions from one river basin to another (water goes directly from one river into another)

north of Red Deer

Edmonton Key word is "investigate." If you don't want to investigate - are you afraid of the answers? A good example is when the government investigated the Meridian Dam - don't see a problem with that.

Against all water diversions but the government just doesn't get it. Some people have a vested interest in how water is managed. Their concerns are not being considered. Is the government finding some way to get the public to come to their way of thinking by "investigating?"

There are some kinds of economic development such as tourism, fisheries, and recreation that require a healthy water ecosystem. There will be some winners in economic growth even if there aren't large water diversions.

Don't approve of inter-basin diversions.

Studies cost money - the government can do anything you, as a taxpayer, are willing to pay for.

Westlock Opposed. Environmental concerns, disease transfer, the price society would have to pay. We have the water, the oil and gas, the infrastructure. Why would we want to send our water somewhere else so they can develop? If anybody needs water, bring the development here. To give it away encourages more population elsewhere. We'll end up with no jobs.

Rocky Mountain House	It should not be. Introducing one species to another and because it's an open waterway you're actually losing from the source system. Also means that water can be sold to the highest bidder - makes it a saleable item. No inter-basin transfers.
Grande Prairie	Very much against. However, if the majority of people in Alberta agree to divert water, it will probably happen (more people in the south). Ecologically, dams are a problem, plus mixing water is a problem. Who pays for the expense? Would need a whole series of dams plus canals, etc. Again, a huge expense to assist a relative small number of farmers. Disagree that little information exists on cost (as stated in workbook). There have been years of study.
Peace River	Economics resulted in the Meridian Dam being turned down. A pipeline to southern Alberta would be equally unfeasible. Economically and environmentally ludicrous. American are willing and able to pay for diversions of water. Americans monitor water in southern Alberta very closely. Are very aware of any diversions that would affect the flow into the U.S. Do not agree because if and when water table rises you'll run into problems. Can cause a lot of ecological problems. Storing water would be a better system. Suggested to southern ranchers that they move their cattle up here, rather than moving the feed down to them. However, these days they calve all year long and because our winters are two months longer than theirs it means more cold weather for them to contend with. As soon as we talk about diversions, Americans will be standing in line. Would fall under NAFTA. Don't open Pandora's box. Major diversion was investigated during the Lougheed years - the cost was astronomical.
High Prairie	Skeptical about any transfer. A good year may be followed by 3 or 4 dry years. My experience is they can't stop at just "investigating" - so don't even start. "Investigating" would be the first step down a slippery slope. What's the point in studying it if you're not planning to do it? Politicians have a way of taking an idea and then it's happening before we know it (pressure from constituents).

Red Deer and south

Hanna	Depends - if you're on the receiving end, it's a good thing. In an area like this, we don't think it's a good thing to send water to other areas. Investigate it, sure - but proceed cautiously.
Lethbridge	NAFTA - would be the biggest ecological disaster N. America has ever seen. The ecosystem will change if water is removed. Nobody has the right to make that decision. Changes that can never be retracted. Too destructive.
Medicine Hat	If the ultimate use of this transferred water is for heavy oil industry, then the investigation would not be worth its price. Misleading wording. Presupposing.

Maybe other things should be investigated first. We're not short of water in the S. Saskatchewan River but it could be managed better - investigate that first.

Ignorance is never productive. Key word is "investigate". We have to obtain information and be in the position to make an intelligent decision.

Concerned about transferring water between river basins - there may be ecological differences. If it could be transferred from a higher elevation and quality was similar and ecologies would not be affected - it may be possible. Investigate it to make sure neither system is harmed.

Red Deer Unsure. A lot of issues about contaminants flowing from one to another. With an open system there's not a lot of control. There are environmental and legal issues. Open systems don't always work – rivers do what they want – haven't been successful in the past.

Key word is "investigate." Our group put a low priority on investigating. A series of dams could raise the level in northern systems and spill over to southern system but the costs boggle the mind. There are a lot of other things we could do first before investigating this.

k. Companies pay for and build their own water storage so they can "bank" water in high flow periods and use the water during low flow periods.

north of Red Deer

Westlock Most of these are very important and need to be investigated - addressed.

What about conserving our water? Conserving can lead to better quality water, less use. Take personal responsibility.

Rocky Mountain House This is already happening in a number of applications: municipal reservoirs, reservoirs in agriculture (dugouts). May be a reasonable approach to take but there should be strict guidelines or legislation to control it. Storage of such water should not be available for other commercial use only for use intended (can't sell out the back door when not needed). In cases of provincial emergencies water stored should be released back into the system for those needs that may have a higher priority. Already happening but to expand this on a greater scale needs some control/regulation.

Fort McMurray Bennett Dam has destroyed downstream users. Large scale projects seem to be used, rather than small ones. Don't agree with these last three options.

Syncrude has a lake, not used for anything else. Industries are already doing this.

Peace River The amount they could store would have to be factored into the licensing and allocation process.

Depends on how big the water storage becomes: how much is greed (how much would they sell it for)? A. Still only allowed their allocation of water.

Yes, if it's economically feasible and at their own cost.

High Prairie Don't think it's realistic or practical as it would be such a large undertaking. Then, if we had wet years, the water would never be used anyway.

There has already been activity like this on Lesser Slave Lake with a pipeline to Swan Hills. If the pipeline still exists, what's stopping other companies from using it?

Is that not what a lake is? Where could you store enough water to supplement the level of Lesser Slave Lake?

If the purpose of the industrial use of the water is to dilute effluent, it might be a better idea to make the users upgrade their technology so that they don't require the water. We should be looking at closed systems and recycling.

Red Deer and south

Stettler Agree - farmers do so already.

Hanna Agree. Same as agriculture (irrigation districts).

Lethbridge Some already actively doing this. Industry should recycle and reuse their water.

Key word is "investigate" - Don't advocate necessarily but need to investigate along with options for managing the Saskatchewan basin more productively.

Depends on scale of project. May lead to those with money having water, those without do not. On a smaller scale seems okay, but not on a large scale.

May lead to water ownership by companies - be wary.

In southern Alberta this has been a very useful practice for much of our population - can't disregard this.

Industry is aware they are polluting. Need to invest more time, apply more resources to solve problems.

Should force industry to come up with cost effective solutions for recycling.

Medicine Hat Sheerness Generating plant built were required to build their own reservoir to circulate their water (Fording Coal). County will be recipient of generating plant. Can only be filled during certain times of year.

Necessary. Being done now. Every new license (junior) cannot impact the delivery of water during high demand times. Take water in high flow periods. Accommodate a year's supply in storage.

Red Deer Who controls this? Big money companies? International companies? Build up big reservoirs for themselves?

Some discussion on affordability. Larger companies would have a better advantage to do this. Investigate some type of commercial value for that use.

In agricultural communities this is standard procedure (e.g., dugouts and stock watering dams) - wouldn't survive without them.

Add your own example ...

north of Red Deer

Fort McMurray If we transport water - what will happen to our fish?

Water is also a means of transportation for us to bring in our freight. If we divert - we must be guaranteed (as members for Fort Chipewyan) that we can still transport food at a reasonable cost. Expenses are going up as a result of taking water out of the river system.

High Prairie We don't seem to have a long range plan re forest and vegetation clearing. What areas are being protected to store water? There's a lot of agricultural land sitting idle yet they are still clearing land. Government should put a stop to it until all agricultural land currently cleared is being used.

Clear cutting in the swan hills region has affected river flows and water quality. We need a monitoring process. When we requested justification of how forestry operations are conducted, they provided a document where a consultant verified that their operations had no effect on the river flows and quality. We know there was an effect. How do we get proper monitoring from the department who provides the permits for these activities? Other affected parties should also be able to monitor effects.

For forest use and industrial use, the biggest problem when developing an area is road and access - oil and gas industry are the biggest players. Even though forestry tries to plan, another industry can often come in and build access roads, etc.

Red Deer and south

Medicine Hat Should correct an inaccuracy in the pre-amble to this section. It's misleading: "existing water license holders" already cover existing economy and existing human population. "Existing water license holders" are the existing economy and existing use. This applies to future use - Yes.

water conservation

question 11

Participants were asked to discuss options for conserving water.

a. Establish a price for water used by industrial and agricultural operations

north of Red Deer

Edmonton Water pricing may encourage better use but if you price it, it becomes a "good" and is included under free trade (NAFTA).

Westlock Difficult to establish price between sectors. Two different playing fields. Mom and pop operations may have to fold. Levy or tax or allocate a certain volume of water at a certain rate - use beyond that rate would be penalized.

Acreage owners are also not included. Where do they fall?

Cities and towns should also be included, as well as industrial and agricultural sectors.

Rocky Mountain House

If a young farmer couldn't get an allocation, a retiring farmer could sell his license to him. But industry could also buy it from him. If we put water on the open market and give it any kind of price, the only ones who could afford it will be industry.

Hate to see pricing mentioned.

Water for irrigation is paid for yearly at $14 an acre. Normally get 22" - down to 8". New farmers can get same amount as old farmers the only stipulation being that it be for irrigated land.

Registration of traditional agricultural use: concern about this being a way to tax water in the future.

Should not allow payment for water - it's not a commodity. Retain it as a resource that you allow people to use, rather than a commodity.

Don't support this idea. Treat water as a valuable resource and make it available for the public good. Don't treat it as a commodity.

For industries that use water than is not returned - they should pay.

St. Paul

Should be free to all people. Water is invaluable to all life on the planet. The only way to manage it is to acknowledge its value to all of us. Payment is for management and treatment. Promote conservation ethic and apply it to everyone.

If we put a price tag on our water supply, will that make it fall under NAFTA? Will the U.S. get the right to buy a river, lake, or stream?

Insulted by these questions. Government creating a foot in the door to eventually sell our water to other powers. These questions were answered 10 years ago.

Would landowner be charged for water collected in a dug out? Most farmers are concerned about water. Hate to see price established for household use.

Q. What makes the province think they own the water? A. (Rob) Province has an act of legislature to manage the water in the province.

Pay now or pay later. Set a fair and reasonable price now or the next generation will suffer. Have to think long-term.

Consumption of surface water: when you use non-consumptive forms of use, price should be set differently than for consumptive use. This would help to ensure people are a little more responsible.

We should all pay for our water as long as we get cost of production+ for our products and a wage equivalent to the Premier of Alberta.

People are willing to pay for environmentally friendly products. Without sprays, the cost of production is astronomical. Same price for beef in 1952 as we did last summer. Farmers are subsidized by second jobs. Hauling water increases cost of production. Farmers need a union to make a difference, to have a strong a voice as industry. Food costs do not reflect the cost of production. Water costs making it difficult and government doesn't care. We should not pay for water? If well goes dry government should pay for another well.

We now have industrial agricultural practices - how do you separate those from the family farm? Intense livestock operations use as much water as some major industries.

Separate industry and agriculture.

We pay an enormous price right now or bottled water. Industry is taking a potable resource (only paying cost of license), using it, and exporting the profit to their shareholders. Agriculture and human use should be separated from industrial use.

Volume discounts for industry promotes increased use of water. If a price is established, don't follow that model. Shouldn't put highest price on lowest water users.

Fort McMurray Those industries who pollute the most should pay the highest price.

Industry are more able to pay a higher price. Will that take priority over residents?

Who will be setting the prices for industry? For their licenses?

The agricultural industry in southern Alberta is one of the biggest users. Pricing water will make some of those practices uneconomic.

May jeopardize FITFIR - richer companies could get more water than poorer.

Grande Prairie Not an incentive as the cost is just passed on to consumers.

We're in this together. We're all part of problem. Need to be part of solution. Government should be there to help us.

Red Deer and south

Calgary 2 Have to weigh conservation costs against cost of dams, etc.

Do what's good for the people and the environment. Fees would just be for government and industry.

If we're prepared to pay the prices we do for petroleum products, lumber products, minerals, agricultural products: why should water be cheap?

Works against conservation - it just becomes an asset. Short term may lead to some conservation but if warming patterns continue and economic and population growth continues - asset becomes more valuable - then how do you avoid economically diverting it and selling it?

People will consider it a valuable resource if priced. Will create more awareness of conservation.

Have a concern about treating water as a commodity. We should develop a respectful attitude toward water (all aspects of life) with the community at large.

b. Establish a price for water used by individual households

north of Red Deer

Edmonton We currently pay for the delivery of water. Water itself should not have a price.

For 30 years, we've been getting water out of our well. Now you're proposing charging for water? That's another tax. Need to get this out of the realm of government. This is government control to generate more money.

I already pay for the water I use in my house. The new water systems in new houses (multi-pipe plastic systems vs. copper piping) allow for a great deal of waste (both in water and energy for hot water). Will run into a lot of money over the years.

Pricing and conservation are two separate issues. We need to value water appropriately but pricing water disregards social concerns. Need to find a way to incorporate the value of water into decision making when making allocation decisions. Conservation is a valuable investment that doesn't need to be tied into pricing. Invest a fraction of what would go into large infrastructure into water conservation plans.

If we value the environment, we should be willing to pay for it. Put a price on water and the revenue could go into conservation, research, industry incentives, salinization issues, and revisiting older industries who were approved when standards were lower.

Westlock

Establish a three-tier pricing system. First tier: per capita system to everybody - free. Second tier: by volume to allow for household use. Third tier: by volume for luxury use (such as pools).

Rocky Mountain House

If water becomes a cost, a young family who is not wealthy may not be able to afford it. Someone would receive payment for your living on this planet. Our society has to be very careful about this.

We already have pricing for water (minimum rate with extra paid for anything over). It is one way of promoting conservation. Reluctant to say we should allow selling if you have a surplus.

St. Paul

The fear of pricing water is that we will come under international law and there will be great pressure to export our water. Water is an important resource: consider it sacred.

No individual household pays for water. We pay for pumping, treatment and distribution. Agree with establishing a price for industry and agriculture but you can't apply it to individual households - it would be a burden and how would you enforce it?

How do you control water? What constitutes a farmer?

People would die if we start charging for water. When will they start charging for air?

Meter water flow and adjust prices accordingly. Use it more wisely. Incentives to industry to use the water more efficiently.

Have to differentiate between urban and rural household use. Urban use is out of the tap. Rural use can cost up to $10,000 for a well, plus dug out, power to run the system. No comparison.

We all should pay. All operations - all pay same price - use more, pay more. Should have to clean the water after it's used. The more you dirty it, the more it will cost you to use it. Will result in better management practices.

Major concern with charging everyone for water. Hauling water around will cost more than it will generate. Conserve water, clean up water when it's returned to the system. Will cost more to regulate than it will generate.

Fort McMurray

Hauled water hauled is recorded and metered. I make sure my children know how much they are using. It does make us more aware.

Many households already pay for bottled water. Individual households are not the polluters - not as heavy as industries.

Concerned about people who are unable to manage with high cost of living here. Water is a necessity of life. A better idea would be to set a limit based on the number of individuals in a household. Once past the limit, then you would be charged.

Grande Prairie

How can you monitor people who use water from their own sources?

Red Deer and south

No discussion.

c. Educate Albertans about water conservation values and methods

north of Red Deer

Westlock Developing incentives can be as difficult as water policy itself but need them to speed change.

Slow process, some kind of incentive to get people to improve (similar to recycling). Will take a generation at least without incentives.

St. Paul Start with children in classrooms.

I wasn't educated in high school about conservation (only blue box recycling). Kids are an unused resource: get them out there checking water levels, replanting trees, become more responsible - they will learn to care more.

Education needs to continue: frustrated with government. These forums are repetitive. Feel economics is the bottom line rather than long term management goals.

Use more creative methods to educate kids (i.e. partner with McDonald's [restaurant]).

Water is a very important natural resource that has to be protected.

Government should provide incentives and encourage the use of devices that save water.

Funds from pricing could be set aside to clean up messes made in the past.

We have been educating for over 20 years. Agree it's important but this statement implies it hasn't been done - when it has. Don't know if it has lead to water conservation.

This point is tied to point 2 [establish a price for water used by individual households]. If you don't price something of value, people will take advantage of it. Those who choose to be good should get incentives. Those who choose not to be good should be penalized. There are stumpage fees for forestry. Taxes for a resource. Education costs something. The question is who pays and how much? Too much time is spent on worrying about 5-7% of water consumption: larger users need to be looked at.

Educate adults: there should be a cost associated with such things as draining wetlands.

This point leads to point 4 [establish water conservation incentives] and takes us back to point 2 [price for individual households]. Money talks. People pay more attention. Fair price has to be set - less for rural, more for urban.

We tried alternating days for grass watering. It actually resulted in using more water because people felt compelled to water on their given day. Government should investigate proven methods of conservation to assist municipalities.

These workshops could go into schools.

Great idea. Should have an energy efficiency branch in government.

Fort McMurray Place a lot more emphasis on educating people and ensure people are aware of what is currently available for water saving devices. Encourage people to use them.

Government needs educating.

Educate industry on the use of their water.

Grande Prairie Compared to Europeans, we have little knowledge about how to use water. Although a renewable resource, there's a limit to how fast you can process it to use it. Learn from others.

Educate people to use water wisely at home.

Education is the key: have to educate from elementary through all grades.

In July, people were consistently getting water in their basements. We researched the problem and let people know it was caused by over watering their lawns. We saved thousands of gallons of water by researching and letting people know.

High Prairie Our best insurance is our future generation. What conservation is being taught to them in schools? Are the things we're talking about being instilled in them. Important that our kids be given the right to learn about conservation of water.

Red Deer and south

No discussion.

d. Establish water conservation incentives (e.g. tax rebates) offered by government

north of Red Deer

Westlock Some agree, others feel it should focus more on education - some concerns with incentives.

Rocky Mountain House Industry and municipalities should be encouraged by government to use reuse waste water, rather than dumping it.

Rebates, such as the one from natural gas, should be used to encourage people to look at alternate forms of energy (or water use).

Further south, the number of water meters decreases. Edmonton has lots of water but has had meters for a long time. Doesn't make sense.

Fort McMurray Treaty 8 - we don't pay taxes. Turn off water if people go beyond reasonable use (wasters).

Peace River Opposed to incentives. Rather, use disincentives - make it costly to waste water.

Red Deer and south

No discussion.

e. Set targets for water conservation for various sectors using best management practices

north of Red Deer

Westlock	In theory, good. Actual logistics across sectors, difficult. Who decides what are the best practices? Difficult to implement.
Fort McMurray	Setting targets allows them to manage water but don't appreciate the value of water in the first place.
Grande Prairie	Already incentives for air pollution - hasn't been effective.

Red Deer and south

Calgary 2	Looking at non-storage options has been neglected . The Highwood Little Bow basin is over-allocated and they are correcting it by growing different crops and doing irrigation retrofits. First time province is taking a positive step. We have existing strategy in legislation that is being ignored (such as protection of fish habitat) but because of FITFIR, priority is often given to license holders. AE has to give priority to compliance with the Fisheries Act. The greatest gains for conservation would occur in the agricultural sector. Improved systems that avoid evaporation and waste. Some technologies (e.g. drip irrigation) are very expensive. However, farmers have made huge inroads - they are converting. This drought has also proved that you can make do with less water, if you have to. Province should ban salt water softeners. A hundred billion pounds of salt ends up back in the river. Technology is available to replace salt systems. Other areas in the world are banning salt.

Add your own example ...

north of Red Deer

Edmonton	Disturbing that there's only 5 questions on water conservation. Conservation has a huge impact on all other areas of water management. Three out of the five are about pricing. Nothing about water use, recycling or other technologies. Not a good effort at issues of conservation.
Westlock	Motion detector taps - perhaps government should offer at a reasonable rate.
Fort McMurray	Conservation needs vary throughout province.
Grande Prairie	Are we using water properly? Most water is used for irrigation. Is that the wisest use of water? The oil industry uses groundwater for well injection. Is that wise use? Perhaps we don't need to conserve but rather use the water wisely. Are we targetting the right areas?

Red Deer and south

Calgary 2	When municipalities conserve water, it's to conserve how much they have to treat (most of the water is returned to the river system).

safeguarding alberta's healthy ecosystems

question 12

Participants were asked to discuss options for protecting aquatic ecosystems.

a. Determine how much water the aquatic environment requires to remain healthy

north of Red Deer

Edmonton Q. Is someone coordinating the information we already have such as the northern rivers basin study? A. (Pat) NRBS is being used and we are following up on issues identified. There is currently a study underway assessing the cumulative effects of development on the Athabasca system. Information is being used.

Water Alliance is using information gathered previously.

In order to determine the amount of water required to maintain a healthy aquatic environment, the limit of water required will change over time (affected by climate change, increased human use) and those changes need to be considered. Risk curves, future growth, future sustainability, environmental sustainability all need to be considered. It may require us to prioritize uses - sacrifice certain industrial or human uses. In some places in the world water is more expensive than oil. We have a lot of water but are already seeing the results of a decreasing water supply.

Who can pretend to know how huge the ecosystem is - no baseline studies, no money set aside for research. We don't have any idea of what it is we're trying to protect.

Q. Determine the state of the watershed now - then develop a plan. Processes are well defined in the Water Act. There are limited resources in Alberta Environment, why are we asking these questions? A. (Neil) This is a comprehensive engagement on water - need to have all the issues on the table. There was a lot of consultation during development of the Water Act but it wasn't at that time tied into an overarching strategy.

A lot of knowledge and ideas here but when do they become a reality? Facing situation on a lake in NE Alberta which is disappearing. A water strategy was developed in the area but nothing is happening. We need a government that will address these issues, we are powerless. Reports are shelved.

A lot depends on research and our willingness to base decisions on research.

Westlock How would it be done?

Who knows how much you need for a healthy ecosystem? We don't know - how do we answer these questions?

If you don't measure it today, how do you plan for future?

Fort McMurray If the province determines, will they let the public know?

Province should determine how much water is left that is still healthy. The water we drink is treated but am concerned about the wildlife that lives off that water.

Peace River The term "healthy" is a tricky one. A subjective word. Difficult to determine what parameters to use. You also have to decide the level of aquatic environment you're willing to live with/without.

Without this knowledge, you are shooting in the dark. How can you manage effectively without it? Managing effectively eliminates the requirement for many of these other strategies such as diversions. It's a lot more expensive to build infrastructure and diversions that don't work than to do the required research.

Would take a lifetime - whether you come up with the right answer is questionable - there are so many variables. Easier to do on a smaller scale, but looking at the big picture it becomes more complex.

We do need some information but will run into problems because nature doesn't stay the same. Who could have predicted the drought? What priority will you put on the maintenance of the aquatic environment compared to people needing water to drink in Lethbridge?

High Prairie Don't think it should be done. AE will screw it up anyway.

In southern Alberta, many water bodies are man made. Q. Are they also considered natural ecosystems? A. (Ralph)Yes. (Tim)They still fall under the Water Act.

Red Deer and south

Calgary 2 AE did inflow stream quantification data collection. There is some data available about what minimum flow is but we need more. Use the cautionary principle because we don't have all the answers.

Its very good to do the science but then we promptly ignore the science that is done. Southern tributaries did the science and then allocation went ahead anyway. There should be a requirement to follow the science after it's done and provide the money to implement mitigation measures.

Hanna Federal and Province are working on endangered species Act. Will impact this strategy greatly.

Lethbridge Develop much like a zoo - don't worry about original site. Q. (from audience) What does that mean? A. A lot of endangered animals are preserved in zoos (facetious comment, but anything's possible).

Good science is required. Concerned with present situation where science isn't always the best. Information (assumptions) are transferred from one place to another even though basins are different. A lot of science is politically motivated (grants from government).

The whole aquatic system is a resource - can't separate it.

Red Deer May cost a lot of money. There are other ways of doing it other than adding staff - you can subcontract. But there has to be the financial resources and will to do it.

Need to define indicators of "health."

What does word "require" mean?

Who will do this? Government has cut staff over the years? Need a skilled staff. Don't see the will of government here. There's only one water well inspector in the entire province.

b. Determine the balance between the amount of water needed for the aquatic environment and the amount needed for economic growth within a water basin

north of Red Deer

Westlock Will depend on regulations associated with it. Oil company storing water in mined out pits as unusable.

Fort McMurray Essential. Although we would like a pristine environment we have to acknowledge that economic growth gives us the life we enjoy. Doesn't need to be a trade-off - we can achieve a balance if we commit resources to find what it is.

Red Deer and south

Calgary 2 Don't believe there are enough baseline studies although I'm told monitoring is being done constantly. Where is data?

Use the precautionary principle. Don't just determine how much we can do before it's too late.

We generally think of riparian habitat as confined to our river systems but we're finding out it affects a considerably broader area. A study by University of Victoria indicates that forests along salmon rivers get 50% of their nitrogen over 300 metres away from the river from the salmon that bears drop in the woods. Have to expand riparian habitat to beyond 300 metres from river. This seems like a negative billing option - to determine how much damage is too much and then take a step back from that. Irregardless, we have to do the science. Not just about land use of water but how far riparian habitat affects the land.

Lethbridge Yes. Don't know if government should set that balance. Will be influenced by people. As we develop tools, we will make best use of our water.

Population growth has slowed down or even reversed in some areas of the world - can be controlled.

A healthy aquatic environment needs to be established before there is any economic growth.

Government doesn't determine economic growth. We need to be flexible - allow ourselves the ability to grow.

Question the need for economic growth because there is a limit on it - doesn't necessarily need to be continuous.

Think about economic development rather than economic growth.

Red Deer We know little about climate change - can't make decisions as we don't know what we'll be dealing with. We need to concentrate first on water efficiency and then we can work on these other things.

c. Determine the maximum amount of substances (e.g. phosphates) a river or lake can accept without causing it harm

north of Red Deer

Westlock

We may not like some of the answers they come up with but we have to do it.

Should have been doing it for past 50 years. What assurances that they will do it now?

Fort McMurray

Why go with the maximum? Why not find the minimum?

Some lakes have already died (N. Ontario). Don't want to see it in our region. This is a global issue, not provincial. Conservation is important. Experiencing global warming and pollution - there are no boundaries. Mother nature does its own management, but we need to do likewise.

Government should look at the impact of cumulative or combined effects of pollutants in water (time bomb).

Concerned with the amount of development that will occur in our area over the next 30-40 years. Government has to tighten up on policies.

High Prairie

Why do we push it to the limit - shouldn't we be looking at zero tolerance? What's going on now should be reversed.

We've talked about costs but these technologies are already in high demand around the world. The initial cost may be high but advancements on that technology can be sold back creating spinoff benefits.

We often sell technologies around the world that are not being implemented here - why is that?

Very good idea because if you don't know what the sensitivity is of aquatic environments and you allow something over the limit - it's too late. So you had best know before.

Different consultants will have different points of view. How do you determine who is right?

In some cases, the damage is already done. We're talking as though the province is pristine. Almost all rivers and lakes are already contaminated from some form of industry. There should be an option here that discusses cleaning up systems that are already contaminated.

Part of our problem is that different levels of government with different legislations often don't recognize each other (CEAA requires assessment but that information is not always used when provincial decisions are made). A lot of federal regulations are not recognized.

Red Deer and south

Lethbridge

EUB and Environment have many new requirements - why use "max" why not use "min" with no effects. Maximum may build up over time.

Many questions implicate investigation - investigation takes time - need to go with precautionary idea.

Absolutely. We need to be careful we don't pollute.

Red Deer Disconcerting that we are finding out the maximum amount of crap we can put into the environment. An unfortunate approach.

Have to be conscious of preventing these things from getting in the rivers before looking at this.

d. Identify sensitive aquatic environments or habitats that require additional protection

north of Red Deer

Westlock Identify what is in water source, what you will have as a result of development along the flow (discharge) and what system can sustain.

Fort McMurray Athabasca and Peace River Delta - prime example of an area that needs additional protection. Most Albertans don't grasp the concept of an aquatic environment. We that live in the Delta are trying to protect our ecosystem.

Red Deer and south

Calgary Don't know of any irrigator who willingly pays for the power to pump more water than is needed. Only way to cut back is to cut back on growing.

Concerned with lack of integration between land use planning and water management. Wetland policy shelved: natural water management was headed off. No dispute that the best water management landscape is a forest: provides not only water quality but also flow. We have virtually ignored the water function of a forest. We have a problem when we treat these things completely separately. Let's not keep making the same mistake.

There are benefits to everyone from assisting in irrigation - that's why government provides assistance.

Q. Why is water allocated to water bottling companies who are taking it out of a dry area of the province to export - should it continue? A. (Peter) Bulk export is prohibited. That type of commercial use is still available. Can't tell people they can only sell in Alberta. Amount of water used for bottling is very small.

Toilets aim at urban use which is not the biggest use. Surely there is technology for improving irrigation use - a far larger percentage of use.

Q. How fast is that industry (bottled water) growing? A. (Not known)

Crowfoot Creek Watershed Group - developing a whole community plan which includes industry, agriculture, town, etc. Working on best management practices. Local residents usually best at identifying where the problems are. Best to have them work together - not top down. Solution comes down to individuals getting involved in their own watersheds and learning about and understanding the tradeoffs made between various users. Grass roots level is the only way to go. We're having reasonable success.

There are other alternatives for toilets (Australia), different technologies. Change codes to make people use less water.

Missing question: no attempt to rank benefits of uses of water. Much easier to economize on water used for irrigation than to cut back municipalities. Charge for water and use the same rate for everyone.

Reconsider such things as compost toilets rather than flush toilets.

Calgary 2 Sensitive habitats: wetlands within City of Calgary are not being protected. Storm water runoff into wetlands will affect that wetland. Need a case by case assessment as each area is very different.

e. Develop water management plans that integrate protection of aquatic ecosystems with watershed and land use management

north of Red Deer

Edmonton North Saskatchewan Watershed Alliance (former Executive Director): It's the only way to go. There are world examples that it's the appropriate way to manage the resource and the environment. Have 100 organizations in our watershed to discuss planning. Only way to address cumulative impacts because of land use practices.

In 1995, there was a unanimous recommendation that there should be water management plans - how many times do you need to ask this question? Frustrating.

All water is the interest of the province. As economic growth occurs, a landowner with water is affected by what he can do on that land. There should be a remedy for that affected landowner - he should receive some benefit from maintaining water that is of benefit to others.

Westlock DFO (Department of Fisheries and Oceans) are looking after already, protecting ecosystem.

Wetlands have been destroyed, particularly in oil sands area. How are they going to replace or restore what has occurred? They are important. Is anything meaningful to come out of this when regulators have already had the opportunity to alleviate some of these challenges, but here we sit discussing it?

Advisory groups should have the ability to make decisions. Water will be bigger than health, education, oil. The management issue is absolutely crucial - authorities have to be looked at.

Watershed groups - they are grassroots, the people who live on the land are making decisions. Very encouraging.

Who decides, who polices, what are the consequences for failure, what do we want? These are management questions. A basin advisory committee where a "joe average" mixture of representatives can have some involvement in decision making relative to their particular basin is a concept (if it has some decision making ability) that has some merit. Not sure that I trust politicians to make these decisions.

Q. Does provincial government have in place any policing on waste disposal, etc.? A. EUB or Environmental Enhance and Protection Act. Approvals based on what they can and cannot do. Monitoring is done.

Peace River Without the knowledge, if we lose a species. we don't even know what we have lost.

A good idea. May be a challenge.

The way to go for the future. May even have to restore some of what we've lost in order to maintain healthy watersheds. Relates to first item (determining how much water the aquatic environment requires to remain healthy). We also need to know the interrelationship between wetlands and river systems, etc. and how much water we need in our landscapes and how it relates to land use management.

Sloughs filter water. A lot of farmers are more knowledgeable than previously and realize the importance of sloughs and wetlands.

We all have to face facts and look at it scientifically. But sometimes dollars override our decisions and we don't deal with issues until we have to.

High Prairie We should also develop wastewater management plans for water basins.

Getting everybody to agree on anything is next to impossible. Everyone wants their chunk of the pie and are not willing to give up their share. We should try to find a way to do this but don't hold your breath.

Integrated plans have been attempted in a number of areas in this region. It's difficult to get stakeholder buy-in because of the cross over of many interests. However, it's good to do.

Q. How do you bring beavers into the equation and how do you license them? A. Have to determine the impact and resolve the issue on a location specific basis.

Are we prepared for when this is a desert (after forestry is done)?

Even if you get the majority of a group agreeing on a position, there's never been anyone to enforce it. Why build more plans when we're not prepared to enforce the plans that are already in place?

Why make plans if they are not implemented? These plans cost money and shouldn't be put on a shelf. There's no sense in getting people's hopes up and then doing nothing about it.

Red Deer and south

Calgary A key point. It ties in the problem of running water and sewer pipelines into other regions. Breaks are a concern. Bragg Creek trying to address through a plan. May have to limit population to only as many as the area can sustain.

Hasn't been done yet. Worth doing. Land use does have an impact on water.

Integrated plans are essential: if we don't protect watersheds and riparian habitat, they will die. Ludicrous to go ahead with a strategy without protecting river system.

Calgary 2 In rural areas, we need to go beyond the IRP concept. That philosophy was current 15 years ago but no longer. Relationships between activities that occur on the land are important and should figure into planning in an integral way. Based on not good science, activities were allowed in predetermined zones.

Needs to be done province-wide: need to consider each watershed and how they affect each other.

Stettler Emphasizes need to determine base needs and recognize variability that exists within these systems. We must manage within that range. Some systems don't always have water every year and therefore perhaps shouldn't (in the management plan).

Need to find out what the base needs are for water so that these systems function in a healthy manner. How is difficult but the need is there so that use over and above can be managed.

Buffalo Lake Stabilization - has taken this approach. If we don't take approach we will have much less water to work with in the future. Cleaning up pollutants must be tackled. Need a good flow of water to accomplish this.

Reasonable philosophy.

Buffalo Lake: It cost a lot of money to pump the water over there. The lake level is being maintained artificially. In the old days, they had hay at the bottom of the lake (1915-1917). Many areas in this country were desert.

Hanna The basin (watershed) approach with broad representation from all sectors provides the best planning. We've found we can often adapt to accommodate others' needs.

What impact does a water basin plan have on NRCB, petroleum industry, municipalities - who uses this plan? A. Approved plans must be considered by decision makers. Under NRCB it isn't legally required. However, decision makers want to have guidelines and will refer to a plan that has been developed by a stakeholder group.

Lethbridge We've been neglecting watersheds for a long time. Uses such as golf courses, ski hills, resorts - all have to be investigated.

Natural or artificial ecosystems (such as irrigation) become defacto - define parameters of what we are looking at. Areas in world with much higher density - should be room for a lot more people and agricultural production. But should be looked at. This process long overdue.

Yes. DFO are responsible for aquatic life in river. They can reach into watershed - jurisdictional problems between provincial and federal governments. Needs to be some resolution between different policies - integrated - water is one part of it.

f. Maintain an amount of water in aquatic environments that will protect ecosystems even though it may limit human use

north of Red Deer

Fort McMurray Who will determine? How will they be implemented? Rules established to date (special places) were an exercise in futility. Need to do a diligent job putting in meaningful rules and regulations. Applies to many of these issues. The Athabasca Peace Delta is an example of poor diligence.

Rather than limiting human use, what about the water that is exported to the states?

How do we support the province, when they don't support the Kyoto initiative?

If other areas have more attendance, they will have more input. Is the input in each area important? Are we at risk of losing our water to the south with not many people here? There's more farming in southern Alberta and they probably feel they need the water more than us.

Agree. There's a relationship between item #2 and this one. We must maintain the aquatic environment and human use may be limited.

Peace River Have to do something to maintain a balance in the system. If we drain sloughs, we don't always know the effects. In southern Alberta, many aquifers are not being replenished because we have drained the surface water. In the long term, it will be important to maintain these wetlands.

What other preventative measures can we take? Use common sense. Use our knowledge of the water system, of those people who have being using water systems for years. Judge every issue and region on its own merit.

Many variables affect the water systems (temperature variations, rains, snow pack). Need more information in order to better use water and take care of it.

There is a lot of variability in the weather from year to year. Some years are dry enough that sloughs dry up on their own. Sometimes we start to change our water use based on one or two year's activity - not a good idea. Aquatic ecosystems will have to adapt to generally changing conditions.

Red Deer and south

Lethbridge In U.S., irrigation dam shut down in order to protect aquatic life. Cost benefit analysis showed it was not a good way to spend money. But because they couldn't stop the project based on a cost/benefit analysis, they used the fish (suckers) study as a way to shut it down.

Yes. We sort of do it now but depends on how you define "protect."

Red Deer Have to be aware that ecosystem is a reflection of where we will be as humans later. Have to protect our ecosystem.

Have trouble with the wording of this question. It defines action where the other statements do not (determine or investigate). May affect the answers you get.

Add your own example ...

north of Red Deer

Westlock What about effect of recreational use on the water? Some lakes are heavily used, plus cabins (sewers leaking) etc.

Red Deer and south

Calgary 2 Not happy with terminology. Why so much emphasis on the term "aquatic"? Water is the base of all ecosystems.

additional comments

At the conclusion of each community workshop, participants were provided with the opportunity to add any comments they wished. The comments have been sorted into those about water issues and those about the process for Alberta's water strategy.

... about water issues

north of Red Deer

Edmonton

Q. Large use of water for irrigation. Should limits be put on irrigation? Is there a cap now? Certainly shouldn't be lifted. A Irrigation is often FITFIR - therefore have a high priority.

All the things we've discussed - some other place in the world has already done. Why don't we investigate what they have done - what works and what doesn't?

Q. I assume there is a premise that there are increasing pressures on Alberta's water supply. Has the government investigated why there are increasing pressures - why water is decreasing? Prevention is better than a cure. A. (Ed) Since the 1970s, allocation of water and water use has grown on an exponential growth curve that coincides with the industrial and agricultural growth in the province. Also, the population has gone from 2 to 3 million.

Market-based solutions: my fear is that if a water market is created (supply and demand), only the rich will be able to afford it.

This audience is far ahead of the vision of the government. Don't think government cares when they are cutting budget to AE. We want you to do all these things (although not more dams and diversions). Tell Minister to stop cutting budget.

If water is market-based, it will end up like every other market - with very few controlling it.

Westlock

Government needs more time to develop any change in policy.

No matter the amount used for urban or agricultural use, none is lost from the water cycle. Not so with the oil industry: they take water from the system and pump it down into salt water aquifers. No reason to do this (except money). It's a criminal practice. A waste.

DFO (Department of Fisheries and Oceans)office in Edmonton are fairly heavy handed on what they believe is right. If federal government has their own agenda - what does provincial government have a say on? Will provincial regulations mean anything?

Rocky Mountain House

Water allocation and consumptive use: with 57% of natural flow allocated (Bow and Old Man), how are we supposed to send 50% to Saskatchewan? Is the province still going to allocate? The Red Deer River basin does not want to be a donor basin to southern Alberta. We are growing - we need the resource.

When you manage the forest, it makes a lot of difference in the water supply. Look into practices that would address this.

AE does not have resources to manage surface water: they operate on a complain-driven basis, rather than by monitoring. By then it's way too late and damage is done.

No options for water management should be off the table yet (including dams and diversions). Get serious about effective action on conservation and watershed management.

St. Paul Q. Water Act: what are implications of establishing a price for water (NAFTA)? A. (Rob) Don't know.

Resource has to be recognized and enhanced, not degraded. AE keeps changing the bar of what's expected. Have to put in elaborate systems to deal with hypothetical situations. Technology will not win the battle, rather serious thought to long term management of water bodies. Counts are rising quickly. Treated water that runs through system helps keep people healthy. Source protection and watershed management is hugely important and should become the priority for the province. Spending money to update treatment plants is more expensive that looking after the source.

Will government listen? A large hog operation (180,000) that was denied approval in St. Paul and Provost was approved in Beaver Lake (bird flyway, habitat). Federal - Kyoto - province says no. I'd sooner breathe clean air than have a better economy. Have to draw line somewhere.

Get your well fully tested now. What happens upstream from you is very important.

Fort McMurray Back off and leave rivers alone - done enough damage.

Q. Are water rights part of free trade? A. No. However, there are cross-border agreements about the rivers that flow to the states.

Q. Does provincial or federal government have the final say on water? A. (Pat) Administration of water was transferred to the provinces in the 1930s. There is a potential for the federal government to assert their authority over the province but they would need justification to do so.

How does province deal with the rivers flowing to other jurisdictions if conservation methods are put in place? Are there agreements between provinces? Are other provinces doing the same thing as Alberta? A. (Ralph) Some agreements in place. Commitments to provinces downstream. Don't have agreements with BC and NWT at the moment.

BC Hydro: many rules and regulations were disregarded when dam built. Government determined that jobs were far more important than consulting with people and issuing licenses. Critical that we have input into how regulations are written.

Plant at Christina Lake: I have to trust whoever is testing the water samples. If I tested it separately and found it to be polluted, would Alberta Environment support me? A. (Pat) If pollution is a concern: there is a hotline. Even if you only suspect, you can still call. Q. Are these places paid off by big industry? A. No.

Putting a cost issue to a lot of these questions. Water is taken for granted by Albertans. Conservation issues have to be seriously approached and take into consideration development, water systems, quality of water, quantity water. Can't answer many of these questions as I don't consider water a product or a resource. What about air - is that next? Albertans should be concerned. Many consultations have been shelved over the years.

Feel uneasy. Don't support some of the options. Do support conserving water. Water is required for life. We try to maintain our livelihood through traditional uses. There has been a tremendous change in the last 40 years in this region. Our livelihood is rapidly being destroyed and our region polluted. I don't trust the government to determine how I should live. Resources are part of our land base, and if people are taxed it's because they use the resources. Don't come and tax me now on a resource I need to live. Industry is greedy to the extent that land is damaged. Haven't seen this government do their job in protecting our environment - rather they are polluting it. Need agreements between the two levels of government and the First Nations.

Northern Alberta is a wonderful place we call home, biggest fresh water delta in the world, biggest national park in Canada. This is our homeland, our reserve. We've long been ignored although we've spoken many times in these hearings. We talk because we care and we want to protect our area for our children. Industries will pack up and go when they're done and leave us with this mess. This is global and it will affect their children too. Have to listen to the little guy as well as big industry. Everyone needs water. Other parts of the world will be crying for water - an international issue.

Grande Prairie Lake water depth: we are not able to swim in the lakes anymore - weir management would solve the problem.

Peace River Building dams has less to do with water irrigation and power generation and more to do with political ego.

Q. Has AE done a study on the Peace River to determine how many dams it can handle in a given area? A. (Tim) Some studies available regarding proposed dam in Dunvegan and also at ferry crossing upstream from town. Not aware of any that have determined how many the river could handle. Information available at AE office.

How much water in Alberta is going down deep well injection holes? Need to know where that's happening and how much is going on around the province. EUB reports on this but information should come to AE as they will have to manage the whole strategy.

High Prairie We tend to get lost in all the surveys that are done provincially. I just want to make my position clear: we [Driftpile] don't want our water sold.

It's amazing to me that you don't have a representative from the federal government at these meetings? They have a role to play as a regulatory authority and they are a crucial part of the puzzle.

These same problems and situations have come up before in the U.S. and in Europe. Why reinvent the wheel? Why aren't we learning from other areas in the world?

Q. Why is government going after the cattle industry to cut down on pollution in rivers and lakes? Municipalities are pulling the plugs on sewage lagoons and it's going into the same system. A. (Participant) Municipal water is tested before it goes back into the water system - it's just about drinkable at that stage.

I understand the federal government has enforced some regulations. Their authority supersedes anything provincial. If anything were to occur regarding inter-basin transfers or dams, wouldn't the federal government have to approve it? A. (Tim) Federal government does have jurisdiction where it affects habitat for fisheries.

I would like the DFO to provide a clear definition of navigable water. In the spring, these waters are navigable but won't be later in the year. Would hate to see them enforcing here without a lot of consideration going into it.

Red Deer and south

Calgary 2 Concerned about intensive hog farming operations and the amount of waste they produce. How does this affect the water?

Rivers are dying, fish are dying, oceans are dying, species are dying - this is a global issue. We're next because we're destroying the environment. Alberta is raping the environment worse than anybody in Canada.

Regarding the studies and compliance that has to be taken on by AE staff. AE is consistently cut back in budget. How can they focus on these issues when budget is getting cut back? Sustainable Development also - both should receive more funding.

I want to emphasize the importance of rivers and allocation. Social tensions could evolve during shortages.

Concerned about a study done 10 years ago which indicated the incidence of prostate cancer increased downstream from Banff to Medicine Hat on the Bow River.

Flouride is an issue in Calgary. People assume the quality of flouride in the water is similar to that you would receive at a dentist. However, the quality is not good, only 23% actually flouride, contains many other chemicals that end up back in the river. Needs to be revisited - public were sold a bill of goods. Long term effects have not been analyzed. Haven't done studies on what is absorbed through skin. It can double intake- thereby putting everyone in Calgary at unsafe levels.

Water Act allows government to implement emergency provisions during shortages or floods. Need to define what is an emergency and how do we manage our rivers during those situations. Last two years could have been classified as an emergency - needs more attention. A. Also involves compensation (i.e. paying farmers not to farm).

A sophisticated water treatment system such as the City uses creates a lot of waste water. Are they looking at systems that use less water? Are they improving the quality of the water going back into the river?

Stettler Costs: the most expensive glass of water is one from your own well.

The water we're drinking today is the same the dinosaurs wallowed in. Have a problem with fresh potable water being stored in the ground (injection) with no way to get it back. We have to manage the resource or we will suffer.

Human management vs. resource management. We need to look at limitations of ourselves in relation to resource.

Hanna Registered wells, dug outs, surface water - how do you find out if there is any pre-register of that water on the land? Your title carries with it the licensing. No registrations prior to this year.

Oil industry - water injection. Can they use something else such as effluent (waste water) vs. good water for human use?

A. If a license was issued in 1938 and reissued - does it have the same priority. A. No. priority is lost. That's why it's wise to transfer rather than lose the right to the water.

Q. What do you do with licenses that are not being used? A. Provision to cancel all or part of licenses not being used. We test to see if they are being used or if there are no plans for use of the water.

Q. Who sets the price for water allocation transfers? A. Market.

In some areas, they use dyes to find out information and it can be back up within a week (contaminated). How much of this water is actually reused? They separate it in settling ponds, put some back down. Contaminated water is pumped down disposal wells. Why can't all water be brought to surface, settled, skimmed off and reused? They are concerned with wildlife getting to the contaminated water. Cheaper to leave it where it is.

For wells that produce potable water - can it be used for livestock instead of being put down an injection well?

Lethbridge Q. We've had a number of water strategy committees, basin management plans - how does this water strategy integrate with these other initiatives - will it direct water basin plans? How do we sequence - what about redundancy? A. (Robert) A lot of initiatives currently underway, particularly in southern Alberta. Water strategy is trying to look out over a long time period. Broader level questions. Could say we should wait but we need to keep going with good things happening on the ground now. This strategy may focus some of those plans - conflicts will get worked out. We need to know where you think our priorities should be.

Medicine Hat A river is only so big - can handle only so much - almost at capacity now - greed gets involved. We're at the brink and then with a drought you have a problem We have to draw the line and determine how much the river system can handle.

Majority rules. However, the majority live in urban centres and have very limited knowledge of how water relates directly to our lives. How we use water is not known by urban dwellers. We need information to make intelligent decisions.

Sometimes we have to take away from an individual for the benefit of society. That will happen with water. However, society doesn't want to pay when that time comes. When historic licenses are taken away, we shouldn't leave the person stranded.

Is it all about dollars and cents? Are people willing to pay a reasonable cost for their food?

Protecting aquatic system: 50% of apportioned system doesn't protect the ecosystem. Some very shallow. Important to build reservoirs to support an irrigation system that will serve us well during drought years, not just in a normal year. Protect aquatic system and also agriculture.

Red Deer At the Rocky Mountain House meeting, there was a lot more comment about putting fresh water down wells. Very few comments about that here. Don't interpret that as no concern here - it is a concern.

Current Water Act regulations already protect many of these issues. We don't need more study but we do need more enforcement of what we have.

additional comments

... about water strategy process

north of Red Deer

Edmonton	Amazed at the number of no-brainers and platitudes in this document [workbook]. We have serious issues to deal with - don't feel this process will make things happen fast.
	Welcome opportunity to participate in public forum on a timely issue. We are at a crossroads in Alberta. People are relocating to the Edmonton/Calgary corridor due to opportunities here. There will be population growth, a demand for jobs and the economic and industrial activity to support that growth. Water is an integral part and how we manage it is really important. The Water Act sets out the criteria and we need an overarching strategy - this is the start of that.
	Gone through this process before - concerned it will end up same way (going nowhere).
Westlock	Need to capture Westlock concerns.
	During Ag Summit, the government had already started a plan (that was never divulged to us) but they are implementing it. Where do we stand with this? Can't believe you're just going out to ask opinions - we hear stories about pipelines, changing rivers (diverting south). We are worried about this. Also worried about people who keep livestock, use fertilizers, and use sprays. Westlock had to buy creek where raw sewage runs down to Pembina.
	Not enough people here from area to give a true indication of opinion.
	Can't answer these questions without first studying the information.
	Advertising was poor - people didn't know about the meeting. Notification was not soon enough or not to the right people.
	The way these questions are presented - they are a given. Does anyone disagree?
	Challenges left too much open for interpretation.
	Once responses tabulated from all over Alberta, would like to review them.
	If we had received package earlier (in the mail), we could have read it over and been prepared for a session such as this. Can't help but feel pessimistic about the results of providing our advice tonight. Many people have worked on previous strategies (wetlands recovery programs) with the intent of helping to improve things. Their recommendations on safeguarding wetlands were supposed to have been passed on to government. Has government implemented any of that? Will this also collect dust? A. Had to happen in sequence - Water Act first, then came management plans - currently working on wetlands policy.
St. Paul	Government did this same thing 10 years ago.
	Why hold meetings during calving time? Most farmers cannot attend.

Fort McMurray

Rivers used for subsistence by First Nations: fishing, transportation, travel. Drying up or diverting water will impact those land uses and local economies. Make sure that First Nations are consulted properly, particularly traditional land users.

Don't consider this a consultation process with Albertans.

Q. Will there be a response soon? Will you be coming back? A. Similar meeting to be held with Grand Chiefs in April.

Challenges are too open - not worded well. Hard to provide input on some of these challenges.

There should have been more time and this information should have been sent out to every household in Alberta. How will you get a broad perspective from all Albertans from these meetings? It's a concern.

Request a meeting in Fort Chipewyan. Have phoned MLA (since Calgary is getting another one).

Peace River

Challenges: can't agree or disagree - statements too sweeping.

These sessions are a good exchange of ideas but I am concerned that this will end up in a black hole.

Will end result be determined by the number of check marks in this workbook? If so, it becomes a concern for those in northern Alberta (less population).

High Prairie

Only became aware of workshop a couple of days ago (from a friend). For an important process, there wasn't much time allowed for public awareness and response. It leads me to believe there is already a plan in place. People are suspicious of the government's motives by the way they bring these processes to the table.

Fear this process may not be sincere. No legislation to enforce this. Decisions are still made irregardless.

Red Deer and south

Stettler

Q. What is process now? A. 12 meetings, each run the same way. Won't get through all questions but will get a sampling from around the province. Will record comments at meetings. Tabulate workbooks. Report will document all. A random telephone survey will also be undertaken asking some of these same questions. Will be reported to Minister of Environment. Minister will host forum to look at results. Will talk about what to do about it.

Calving season. Poor time for meetings.

Announcement of meeting was poorly done. Not enough notice or advertisement. Rushing through within one month. Hope it improves. Should have contacted a few people such as Jim Fisher (agricultural show). A. (Anne) We are talking with him.

Lethbridge There is a division in Alberta where some of these questions don't relate - some are sensitive to both areas but there is quite a difference. Made it difficult to answer some of the questions.

Be careful with way process is set up. Questions imply they are looking for a particular answer. Predetermined outcome?

These questions are controlled by whoever made them. I'd like to see the average citizen be able to make their own questions. A. (Jim) You can do that.

Medicine Hat Is there a hidden agenda: are we someday going to put a price on water? A. It's an open question for discussion - not hidden.

Q. First Nations' allocations have not been settled - they need to be consulted. Will you be speaking to them? A. All first nation councils and metis organizations have been offered the opportunity to have meetings such as this one.

Red Deer Q. What will you do with this information? Are you opening up the Water Act again? These seem like basic, fundamental changes. A. (Ralph) This strategy will be a level below the Water Act. We don't anticipate changing the legislation but we are also not ruling it out if it's required.

water for life

results from random telephone survey:
copy of questionnaire

Sub-report No. 3
section a

May 2002

Hello, my name is _______________ with Research Innovations, a professional research firm in Edmonton. We are doing a survey of Albertans to gather information about water issues and concerns facing the province of Alberta today and in the future. We are not selling or promoting anything and all results will be kept completely anonymous and confidential. To help ensure our sample is representative, I first have a few questions:

INTRODUCTION

A. To ensure your region of the province is represented in the final sample, could I please have the first three characters of your postal code?

___ ___ ___

ASSIGN TO REGION AND CHECK REMAINING AGE/GENDER QUOTAS FOR THAT REGION

B. For the purposes of this survey, could I please speak to the [person] in your household who is [18 years of age or older] and who is having the next birthday? **[WATCH QUOTAS. READ GENDER & AGE GROUP AS NECESSARY TO MEET QUOTAS]**

1. Yes, speaking	**CONTINUE**
2. Yes, I'll get him/her	**REPEAT INTRO AND CONTINUE**
3. Not available	**ARRANGE CALL BACK**
4. No individual in household in that gender and age group	**THANK AND END INTERVIEW**

RECORD FIRST NAME OF ELIGIBLE RESPONDENT: _________________________

C. **RECORD GENDER**:

1. Male
2. Female

D. In what year were you born? 19 _____

E. This interview will take approximately 5 minutes. Is this a convenient time for you?

1. Yes	
2. No	**IF NO, ARRANGE CALL BACK**

F. Before we begin, have you or any other member of your household recently **(READ ITEMS)**:

1. Yes
2. No

a) received an information package and questionnaire from the Government of Alberta regarding water strategies and water conservation in the province?
b) attended a community workshop regarding water strategies
c) visited the Water for Life web site at www.waterforlife.gov.ab.ca

SECTION I: FUTURE WATER CHALLENGES

1. There are a number of issues and challenges regarding water access and availability which may or may not be of concern to Albertans in the foreseeable future.

I am going to read a list of possible concerns over the next twenty years. For each, please indicate how concerned you are, using a scale from 1 to 5, where '1' is 'not at all concerned' and '5' is 'very concerned'. How concerned are you that **(READ ITEMS RANDOMLY).**?

1. Not at all concerned
2.
3.
4.
5. Very Concerned
9. (No Opinion)

a) Water will become an increasingly scarce resource in Alberta
b) Access to safe drinking water will become a significant issue for Albertans
c) Water availability will limit growth in Alberta
d) Climate change will seriously affect water flows in Alberta
e) Industrial and agricultural growth will increase demand for water in places where water is not always plentiful
f) Albertans will have to choose between sustaining aquatic ecosystems or economic growth
g) Surface water and groundwater will be vulnerable to pollution and contamination
h) Flooding will pose a threat to human safety and create potential damage and economic costs
i) Citizens will need to know more about water systems and wise water use
j) Effective water management will require a lot more investment in infrastructure, such as for dams, and for the maintenance of that infrastructure

2. In your opinion, what is the most important water challenge facing Alberta?

1. **(RECORD VERBATIM)**
998. (None/No important challenge)
999. (Don't Know)

SECTION II: SAFE AND SECURE DRINKING WATER

3. Approximately 600,000 Albertans get their drinking water from a private source other than an approved water treatment facility. These private sources may include a well, lake or hauling water in a truck. Who should be responsible for ensuring that this water is safe? Should it be **(READ LIST)**:

    1. The water user
    2. The government
    3. Both the water user and the government
    9. (Don't Know/Not Stated)

4. Some smaller municipalities, such as towns, villages, hamlets and municipal developments, find it difficult to operate a water treatment facility. Who should be responsible for ensuring that the drinking water is safe? Should it be **(READ LIST)**:

    1. The municipal government
    2. The provincial government
    3. Both the municipal and provincial governments
    4. (Don't Know)

5. Using a scale of strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree and strongly disagree, how much do you agree or disagree that **(READ STATEMENTS RANDOMLY)**:

    1. Strongly Agree
    2. Somewhat Agree
    3. Neither Agree nor Disagree
    4. Somewhat Disagree
    5. Strongly Disagree
    9. (Don't Know/Not Stated)

    a) The province should prepare for the possibility of water scarcity in the province
    b) The province should explore ways to increase water conservation, even if this increases costs to the person using the water
    c) If there are water shortages in the future, the province should put a higher priority on preserving natural aquatic environments, even if this limits economic growth and jobs

That's all the questions I have. Thank you very much for your participation in this survey.

water for life

results from random telephone survey: summary report

Sub-report No. 3
section b

May 2002

introduction

A random telephone survey of Albertans was conducted as part of Alberta's water strategy, **water for life** project. The survey was intended to provide a statistical sample with which to compare results from the completed workbooks and the 15 community workshops held around the province.

Between March 26 and April 8, 2002, one thousand Albertans were randomly contacted for their response to a series of questions about future water challenges and safe and secure drinking water. The results are statistically accurate within 3 percent, 19 times out of 20.

The responses were segmented and analyzed by region (Calgary, Edmonton, smaller cities north, smaller cities south, rural north, rural south), gender and age (18-34, 35-54, 55+). No significant differences by region, gender or age were found.

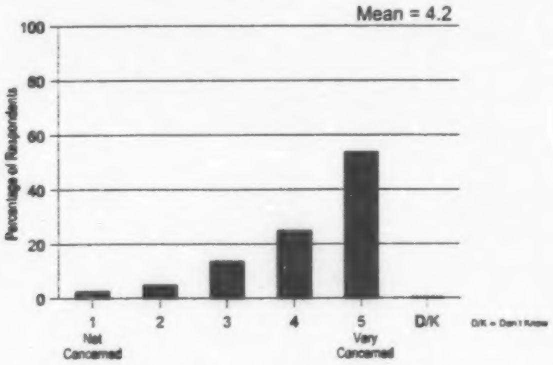
section 1

future water challenges

1. Respondents were asked to indicate how concerned they were about a list of 10 issues or challenges regarding water access and availability that may or may not be of concern to Albertans in the foreseeable future. A scale from 1 to 5, was used where '1' is 'not at all concerned' and '5' is 'very concerned.'

   The results are presented in order of priority (highest to lowest mean[1]). In administering the survey, the questions were asked in random order.

   Surface water and groundwater will be vulnerable to pollution and contamination



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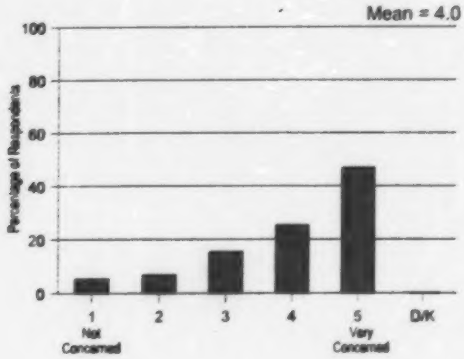
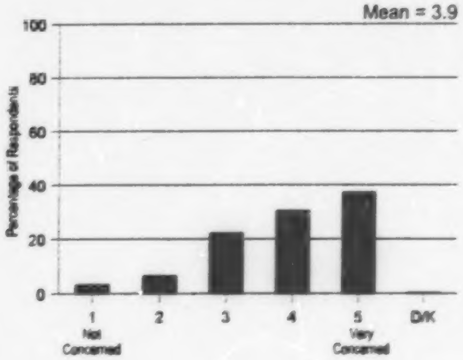
[1] The mean is obtained by multiplying each possible value of a variable by its probability and then taking the sum over the range of the variable.

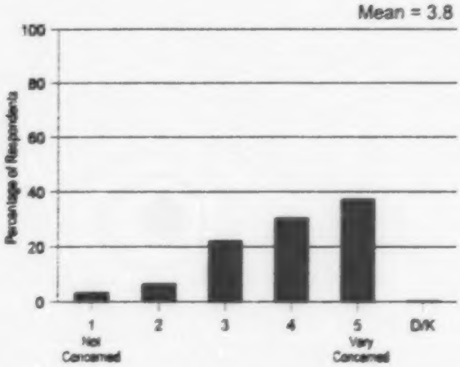
Access to safe drinking water will become a significant issue for Albertans



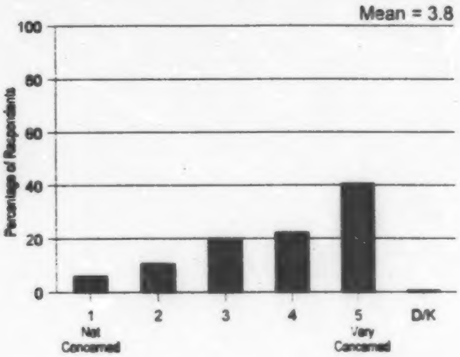
Citizens will need to know more about water systems and wise water use



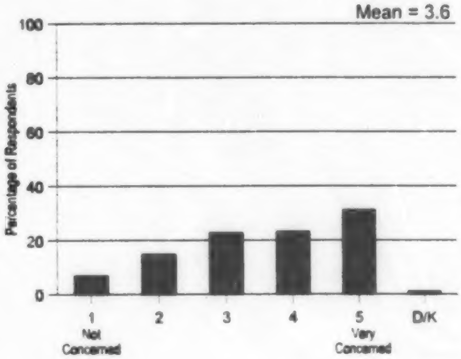
Industrial and agricultural growth will increase demand for water in places where water is not always plentiful



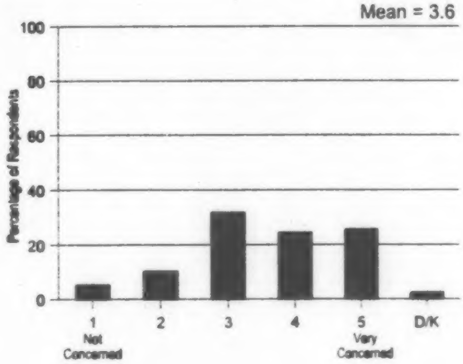
Water will become an increasingly scarce resource in Alberta



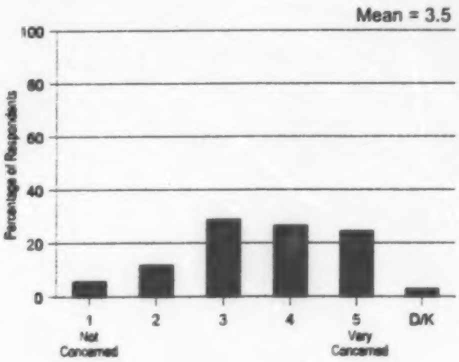
Climate change will seriously affect water flows in Alberta



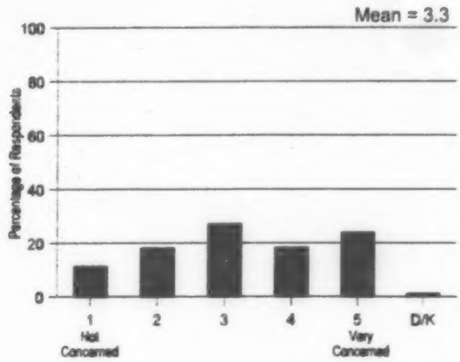
Albertans will have to choose between sustaining aquatic ecosystems or economic growth



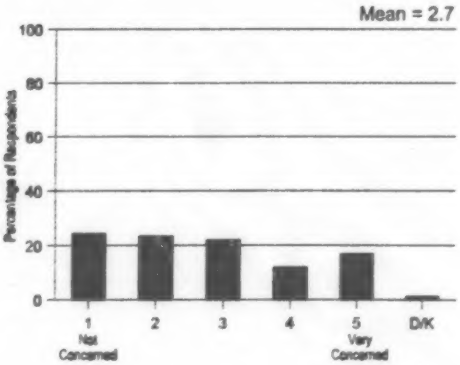
Effective water management will require a lot more investment in infrastructure, such as for dams, and for the maintenance of that infrastructure



Water availability will limit growth in Alberta



Flooding will pose a threat to human safety and create potential damage and economic costs



2. Respondents were asked what they thought was ***the most important water challenge facing Alberta***. They were not read a list of possible statements, but asked to generate their own. The responses were grouped into themes and priorized. Those themes mentioned by more than 1% of respondents are listed below.

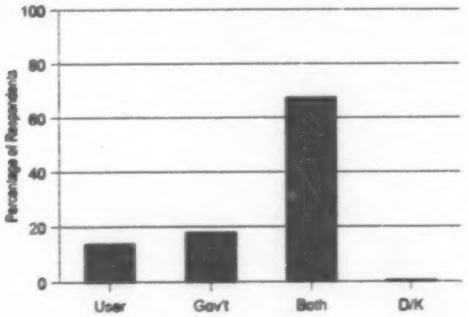
Access to safe/clean water/no pollution/contamination	39%
Water shortages/scarcity in the province	27%
Effective water/management/conservation/personal responsibility	8%
Sale/diversion of water to U.S./drought areas	7%
Impact of weather/climate changes	7%
Impact of water shortages/quality on agricultural practices	5%
Chemicals/additives/parasites in water/treatment of water	4%
Waste/abuse of water	4%
Impact of economic growth on water/aquatic ecosystems	3%
Impact of agricultural practices on water quality/shortages	3%
Redirection of water to drought/dry areas/redistribution of water	3%

section 2

safe and secure drinking water

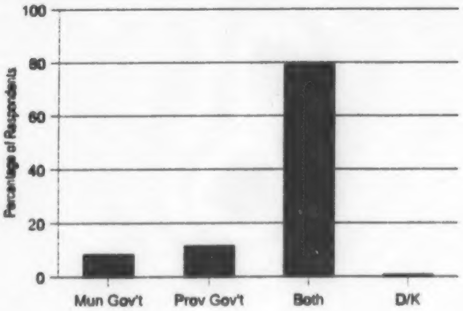
3. Approximately 600,000 Albertans get their drinking water from a private source other than an approved water treatment facility. These private sources may include a well, lake or hauling water in a truck.

Who should be responsible for ensuring that this water is safe (the water user, the government, both the water user and the government)?



4. Some smaller municipalities such as towns, villages, hamlets and municipal developments, find it difficult to operate a water treatment facility.

   Who should be responsible for ensuring that the drinking water is safe (the municipal government, the provincial government, both the municipal and provincial governments)?

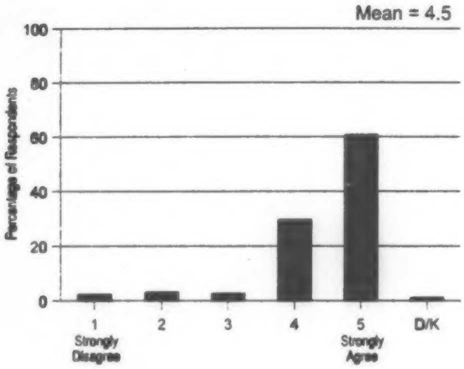


5. Respondents were asked to indicate how much they agreed or disagreed with the following three statements using a scale from 1 to 5, where '1' was 'strongly agree' and '5' was 'strongly disagree.'

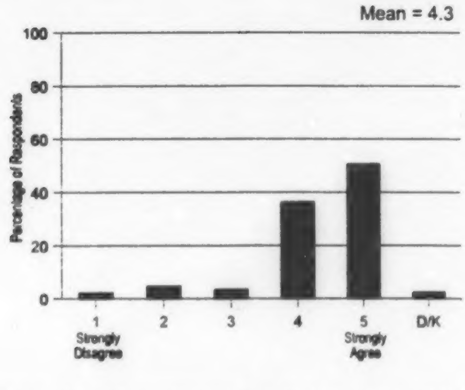
   For consistency in presenting the results, the scale used has been reversed and the means recalculated (i.e. 1=strongly disagree and 5=strongly agree rather than 1=strongly agree and 5=strongly disagree).

   The results are presented in order of priority (highest to lowest mean). In administering the survey, the questions were asked in random order.

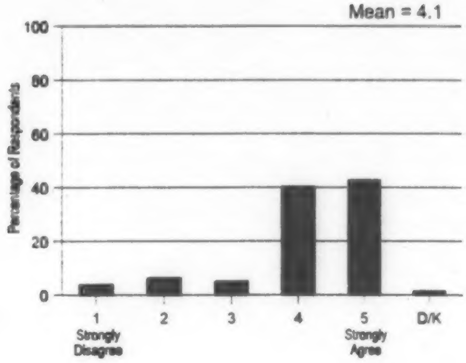
   The province should prepare for the possibility of water scarcity in the province.



If there are water shortages in the future, the province should put a higher priority on preserving natural aquatic environments, even if this limits economic growth and jobs.



The province should explore ways to increase water conservation, even if this increases costs to the person using the water.



section 3

familiarity with project

6. **Have you or any other member of your household recently ...**

	Yes	*No*	*D/K*
received an information package and questionnaire	4%	91%	5%
attended a community workshop	2%	98%	<1%
visited the Water for Life web site	<1%	99%	<1%